The Builder.

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The Work of Surveyors, Urban and Rural.

THE modern Surveyor is a multiform and complex product, rejoicing in a variety of sub-titles, and absorbing many classes of work. The very term "surveyor" is primarily a mystification, for there are surveyors of taxes, of customs, of ships, of land (Ordnance Survey), and so on; and we have our national Surveyors' Institution, whose chief functions are to perfect the management of estates of all kinds.

Mr. Austin Byrne's extensive Treatise, and Mr. Boulnois' Handbook, of which the titles are given below,* have together thrown some additional light on the magnitude of the work which is now expected both from an Urban and a Rural Surveyor, and their perusal brings us very much into contact with the responsibilities for good and evil, for economy and waste, both of money and life, which attach to such an office, whether it be termed, on the one hand, Town or Borough Surveyor, or Borough or City Engineer (Mr. Boulnois' present title), or, on the other hand, District or County Surveyor. The title County Engineer, has not, so far as we are aware, yet been adopted, probably from the fact of most of the gentlemen who held the office of County Surveyor, when the Local Government Act of 1888 was passed, having had to perform as best they may the engineering work which has devolved on them.

It is expected of the modern surveyor, *i.e.*, of the description now referred to, that he shall be an architect, a sanitary engineer (well versed in nuisances and the laws thereon), a quantity surveyor, a valuer, a landscape gardener, a bridge and highway engineer, sometimes a dock and irrigation engineer, a master of gas and electricity, &c. He is also expected to be as artful as a contractor in finding out the cheapest markets for materials, and in the application of labour, both human and machine, to the greatest profit for the public body to whom he is bound. For bound he is by one of the most severe ties conceivable, and Mr. Boulnois fairly places this point before us in the transcript given by him of the "Duties of the Surveyor," as laid down by the sub-committee of the Council of an important borough. To this sub-committee had been delegated the mission to find a surveyor, and they therefore drew up a list of three and thirty duties which he was to perform; no particular exception could be taken to the actual duties, so-called, which pretty well covered the whole ground, but included in them occurred the following clause:—"To devote the whole of his time to the duties of his office, and not to be engaged in any other office, business, or employment whatever." It appears, also, that in some recent cases where a surveyor was wanted, to this was added, that "any fees received by him as a witness or in any other capacity, will have to be paid to the Council."

Consequently, whenever the opinion of a Borough Surveyor so appointed may be required, as that of a leading professional authority on matters probably of great public concern, this opinion is not to be his own property, but that of the borough. It is not altogether an easy point to decide. On the one hand, the "public" want their work well done, and think they have a right to the whole of their surveyor's time, and so they have, if they choose to pay fairly for it; but the stipends offered are almost invariably far below those which most and possibly the best men could be contented with if they are to be absolutely debarred from earning a single farthing beyond the stipulated wage, and are even to have their professional opinions farmed out. Therefore in such cases the mouth of a Borough Surveyor would generally be closed, for it is not in the nature of the general run of men, *i.e.*, men of business, to risk the expression of an opinion on professional matters without tangible compensation; and though his speech might have been as silver to the public, his silence would seem to be gold to himself, for it would be an economy of time. It may indeed be the case that the stress of competition and the strain for life may tempt and, indeed, force men of a naturally independent spirit to accept odious conditions sooner than starve, but we question whether the method is one likely to attract the best men or whether the public service is thereby benefited.

The idea appears to be founded on the assumption that the surveyor would be too diligent about his private business to attend sufficiently to his public duties; but as he is generally liable to be severed from connexion with his Council at short notice if he does not satisfy its members, it may be taken for granted that a man of ordinary prudence—and to hold such an office long requires a man of extraordinary prudence—would set a reasonable limit on the time he would so expend, and would be careful enough to find all the time necessary for his duties to the borough. The position itself is an innovation, for until recently the Borough and the County Surveyors were usually architects with a private practice, frequently members of an old-established firm, held in high local respect, and they managed to dovetail in their work so as to give a sufficiency of satisfaction to their employers. But where this onerous clause is inserted, a man is expected to relinquish, *in toto*, the business with which he is connected (and in which his place would have to be filled up), to take an office where no provision exists for a pension or superannuation, and from which he is liable to be removed at the caprice or from the animosity of a clique of masters. The opulent tradesmen who usually form these councils rarely suspect the depth of anxiety which must underlie the smile of conciliation which their surveyor wears on board days, and although it may be said that the most interesting and often the most useful lives are those which are chiefly made up of anxieties, it certainly seems that in

* "A Treatise on Highway Construction," by Austin T. Byrne, C.E.—Wiley & Sons, New York. "The Municipal and Sanitary Engineers' Handbook." Second Edition, by H. P. Boulnois, C.E.—Spon, London and New York.

the case of a Surveyor the more anxiety of this kind a Council can remove from his mind, the more freely can his mind be devoted to his actual work. The State recognises fully the value of this axiom, and the authorities of some counties do the same with regard to police. And yet we constantly notice that in the conditions of engagement of a surveyor it is especially stipulated that anything in the shape of a pension is distinctly barred. On the whole we cannot but believe that this is a short-sighted policy, and that a town council would be perfectly justified from the broadest point of view in providing for their surveyor's future, subject, of course, to proved misconduct. With such provision, a lesser salary would be acceptable, and the best class of men would not be deterred from placing themselves in competition for such an office. For exceptionally large works, a temporary increase of staff should be allowed to him, and a donation of some kind made on their satisfactory completion. By such means a link would be forged between a surveyor and his council of masters which would strengthen the feeling of responsibility, and relieve the surveyor's office from the condition of an irksome and anxious bondage.

Before taking leave of this branch of the subject, we cannot refrain from alluding to Mr. Boulnois' suggestions respecting the best mode to be adopted to get a municipal surveyorship. If canvassing is not to be prohibited, the members of the corporation are to be invaded in every possible way and at every probable turn, formally and informally, with patient tact and the aid of subtle hints, and so on. It is suggested that all this is out of kindness to the councillors, so that they may not vote in the dark, and he really seems to think that a member would welcome such an opportunity. How would this act? Does the would-be surveyor at all realise the flood of applications for such appointments which shower on the head of the town clerk? Cannot he realise the condition, bordering on insanity, to which an ordinary councillor would be reduced if he attempted to administer ease to his conscience by striving, with the aid of a short personal examination, to select the best man from a host of strangers? It is not at all unlikely that every stranger who attempted to influence a councillor in the manner suggested would be hopelessly excluded from selection. The fact is that if a thoroughly good local man with friends in the Council is an applicant for such an office, the legion are nowhere. But they cannot be expected to know who is and who is not an applicant, or how the filling of such vacancies is sometimes most conveniently arranged before they actually occur. It is an old story, though, how much greater sometimes (or often) is the reputation of a prophet in every city but his own, so the applications for surveyorships are not likely to diminish. The simplest plan is to prohibit any sort or form of canvass, and let men procure a limited number of the best possible testimonials; they must then trust to that which is generally little more than what is termed a chance.

Mr. Boulnois' work contains an admirable series of commentaries on the Public Health Act of 1875, that great Act which has done so much for the welfare of the people of this country, but which has not succeeded in keeping away the plague of influenza, whatever it may do (or may have done) as regards cholera. With the working of this Act Municipal Surveyors and Engineers have necessarily had very much to do; with them it rests to drain the town, and to drain it in such a way that disease is decreased and not increased; they have to wear daily and hourly the cap of consideration, so as to effect this very difficult matter at such a cost as the inhabitants can bear; and this again is, and always must be, a problem very hard to solve. If the rates that have to be levied to pay the interest on the cost of such works rise beyond a certain point, the town becomes, generally speaking, no longer a habitation except for the richest and the poorest classes—*i.e.*, for those who live by charity and for those who practise it. We of course exclude the business centre of every city, which ceases to be a habitable quarter—*i.e.*, a place of habitation both by day and night.

The class which comprises the bulk of the workers has consequently to live on its outskirts, and come into the town to their work by the readiest and cheapest means of locomotion; and though the process is of general benefit to them, for they live more economically, and get a larger supply of air, which arrests the deterioration in physique of the human race, it represents an extraordinary consumption of time. And so the towns expand, and, whatever may be said about the expansion and growth of towns being due to agricultural depression driving rural labourers to the towns for work, we should never lose sight of the fact that it is the high rates in towns which drive to suburban residences the people of all classes who labour, and who form the mass of the population. It will, therefore, be a logical conclusion that the Public Health Act of 1875 has had more to do than has been generally recognised with the growth of towns into cities and of villages into towns, and with their growth has grown the Town Surveyor, especially in his office as a Sanitary Engineer. It is within the limits of his power to scheme for pure air, pure water, and general cleanliness, and place before his masters the cost of providing them. Subsidiary to and in alliance with the Public Health Act, we have the Acts for regulating Artisans' Dwellings, for Housing the Working Classes, for Improving Lodging Houses, for Utilising Disused Burial Grounds and Open Spaces, and for the construction of buildings generally so that they may neither be a source of danger to their occupants or their neighbours. Now pure air cannot at all events be expected unless the sewage is satisfactorily disposed of, and the methods which have so far been adopted in this country with that object are eight in number, as follows:—

1. Passing the sewage in its crude state into the sea or tidal river.

2. Passing the sewage in its crude state over large tracts of land: this is called broad irrigation.

3. Passing the sewage in its crude state on to small tracts of land previously prepared by deep drainage: this is called intermittent downward filtration.

4. Mechanical subsidence of the sewage in large tanks, the effluent passing on to land or into a river.

5. Mechanical filtration of the sewage, the effluent passing on to land or into a river.

6. The introduction of lime or other precipitant into the sewage, which is allowed to settle in tanks, the effluent passing on to land or into a river.

7. The combination of filtration with precipitation, the effluent passing on to land or into a river (Ferozone Process).

8. Treatment by electrolysis, or the application of electricity (Webster process).

Into the respective merits of these various methods we need not enter here; enough has been said of them at various times in our columns, and cartloads of literature on the subject are accessible to the special reader; but we may remark, firstly, that several hundred patents have been taken out in connexion with method No. 6 alone; secondly, that the idea of converting sewage into gold is pretty well exploded; and thirdly, that the difficulty which has yet to be more fully combated is the disposal of that "slimy, glutinous, albuminous, offensive mixture technically known as sludge," and this in connexion both with sewage works on land and in sea and river.

But no system of sewerage can be relied on unless the water supply, both natural and artificial, be considered on parallel lines with it. The two go hand-in-hand, and we are, therefore, a good deal surprised to find the almost entire omission in Mr. Boulnois' book of even an allusion to this great matter, which so much engages the attention of most Municipal Engineers. The fact that water is frequently supplied to towns by private companies should not be a cause for such exclusion in such a work, for in many cases the corporations are providers of water; and, as we know, even in the capital itself, immense efforts are being made by the new governing body to obtain the control of this element of health, and to deal with the most gigantic problems of sanitary engineering that have ever yet had to be faced.

Next to these comes cleanliness, which introduces us to the Surveyor, firstly, as a Sanitary Inspector or Inspector of Nuisances, concerned with the state of the houses and their yards, &c., and secondly, as the custodian of the streets and open spaces, as the Surveyor of the condition of their surfaces, so that dust shall be reduced to a minimum, mud and snow removed as soon as possible after accumulation, and scavenging generally effected. Here the author of "Dirty Dust-Bins and Sloppy Streets" is quite at home, and his work is replete with sage advice on many matters which most people do not like, but which add much to our discomfort and ill-health if at all neglected. One considerable cause of disease is the neglect of house-cisterns, and the absence of or removal of the covers to them, whereby foreign objects fall in and decay, such as "rats, mice, and, in one case, a sirloin of beef, and, in another case, a plumber." In the chapter on "House Drainage," an excellent list of the twelve essential requirements of all good house drainage is given, which a student would do well to commit to memory; whilst, on the other hand, the extraordinary difficulties in the way of taking sufficiently rapid action in dealing with local sanitary defects are very clearly explained. Section 41 of the Public Health Act of 1875 is that which is intended to deal with such cases. No doubt from a legal point of view the clause is admirably draughted, and the right of the public to be lords of their own castles is, within certain limits, very right and proper; but the process requires to be simplified, both for the sake of the patient and the impatient, *i.e.*, the surveyor and the tenant, and this may be read either one way or the other as may seem appropriate.

Amongst the heterogeneous mass of things with which a surveyor has to occupy himself come public abbatoirs, which require quite a special study to provide what is best. All sorts of curious details relating to butchers and their ways, beasts and their habits, have to be mastered before a thoroughly satisfactory design of an abbatoir can be prepared. But, as Mr. Boulnois says:—

"There can be no doubt that whereas private slaughter-houses are frequently a most injurious nuisance to the neighbourhood in which they are placed, owing to their situation and construction, and a visit to one of them is likely to give a strong impetus to vegetarianism; the public abbatoir, on however large a scale, if properly constructed and managed, need be no nuisance whatever, and every town in the kingdom should endeavour to obtain one, not only on account of the nuisance caused by private slaughter-houses, but for the incentive which is given to butchers to abstain from slaughtering diseased or unwholesome animals, the prevention of cruelty, and the material benefits derived in a proper establishment for the best methods of dressing the meat."

The Surveyor has to deal with dead men as well as dead beasts, for mortuaries come within his ken, and after that he has to provide a proper cemetery for burying his population. Of the former there appear to be four classes, each of which require different arrangements, more or less repellant, but nevertheless highly essential, and with regard to the latter it may justly be said that a good cemetery is not an easy thing to make, and when made is not easy to keep so that the mind is not offended or the eye displeased. But there are other very practical matters in con-

nexion with cemeteries which the Borough Surveyor may have to consider: their position with reference to houses of various classes, their effect on rateable values, the geological section (with reference to sources of water supply), and other important points. From cemeteries it is but a step to crematories, of which on several grounds, in fact seven, Mr. Boulnois is a strong advocate, and his remarks are worth reading, though he almost entirely eliminates sentiment from consideration. He takes what is termed the practical view of the case, which may be subdivided between insanitariness, waste of land, and the abolition of sectarian squabble. And he certainly does quote a somewhat startling account of the state to which the soil of a cemetery may arrive; he says:—"A recent investigation was made in the cemeteries of Rio de Janeiro, upon earth taken about spade-deep from graves where victims of yellow fever had been buried some twelve months previously, and this soil was found to contain 'myriads of microbes' selfsame with those present in persons stricken with the same pest at the time of the excavation. A healthy guinea-pig was incarcerated in a space over which earth taken from a grave was sprinkled, and in five days the animal was dead, its blood being found to be literally crammed with the germs of the disease in various stages of evolution."

The destruction of town refuse by fire is the most satisfactory mode for its disposal, and we are favoured by Mr. Boulnois with some interesting details repecting the cost of performing this work and the capabilities of the destructors. Each destructor consists usually of a certain number of cells about 9 ft. long and 5 ft. wide (Fryer) covered with a firebrick arch. From a list of thirty-five towns in which these destructors are at work, it appears that such cells can consume about six tons of refuse per twenty-four hours. The cost varies considerably, but averages about 525*l.* per cell for construction alone. The cost of destruction averages a little under 1s. per ton, varying from 6d. in Batley to 2s. 3d. in Whitechapel. The economics of the case are as follows:—

1. Amount of refuse per head = ·39 ton per annum.

2. Cost of collection = 1s. 6¾d. per head per annum.

3. Cost of destruction = $11\frac{1}{2} \times \cdot 39 = 4\frac{1}{2}$d. per head per annum.

∴ Cost of scavenging per head per annum averages 1s. 11¼d., or say 2s. + interest on cost of works. Which means that this part of the cleanliness for a town of 100,000 inhabitants costs on an average no less than about 10,000*l.* a year, a serious item in the balance-sheet.

One of the very largest items of expenditure with which Surveyors are charged is that connected with the "highways" and their coverings, and a great deal of good judgment and sound knowledge is necessary to expend to the greatest advantage the large funds required for these works. In original construction, as in maintenance, the difference in cost for equally efficacious measures is amazing. Mr. Boulnois has a good deal to say on these matters—*i.e.*, on traffic, on macadamised roadways, on wood, asphalte, and pitched pavements, on footpaths and kerbs, &c., but Mr. Byrne says a great deal more, having compiled a work in which he acknowledges his indebtedness and thanks to the authors of over a hundred sources of inspiration, including the writings of Mr. Boulnois himself. There is no difficulty in finding out what is wanted; the type is clear and good, the illustrations satisfactory. Extending to nearly 700 pages, including those required for a complete index, it is not likely that much has been omitted. The best experiences of England, France, and Germany have been combined with those of American states and cities to make up this treatise, and it bears a good deal of reading. In the Historical Sketch we notice that "The experience of Europe in road improvement shows that the highways should be taken as much as possible out of the hands of local authorities, and administered by either national or state governments in accordance with the needs of the people who use the roads; and that as the whole public is benefited by good roads, therefore all should pay for their improvement and maintenance." This is the very thing which is puzzling so many minds at the present time in England, and is the essence of main road and bye road controversy. The rural parochial surveyor has in many cases been centralised out of existence and absorbed by a district surveyor, and in many cases the latter has also been centralised away and absorbed by a county official. It is possible that some may even think that the last named could also be be dispensed with, and that the Local Government Board might take the main roads at all events, and possibly all the roads, into their own hands. This might do well enough for continental nations or for American States, but it does not suit people's views in England. If the cost of the roads, both main and bye, was met out of State revenues, which are so largely supplemented by import duties in countries where direct protection of home trade and industries is the accepted policy, it would be sufficiently logical that State officials should manage the roads. But that is not the case at present in England, whatever may be in store for us in the future; and if they were entirely paid for out of county funds received from the Exchequer of the State, then it would again be a logical consequence that the whole of the roads should by authority of Government be managed entirely by county officials; but it is from a mixed purse that the piper is paid, and the ratepayer insists on having something to say to the tune that is paid for. Now the ordinary ratepayer cannot be otherwise than profoundly ignorant of this business, and it is quite an accident if his elected representatives to board or council possess any special knowledge of road or street management: so that the surveyor of highways has a very difficult part to play. The suspicion which is the invariable result of ignorance dogs his footsteps and clogs his action. The surveyor may be thoroughly honest, but is frequently believed to be the reverse, and his life is often far from pleasant. The remedy, or at all events an alleviation of this condition of things, is simpler than would at first sight appear, but it is a measure which no really scrupulous man would avoid taking: it consists in supplying to every one concerned, and on every possible occasion, the fullest information about the minutest details of his work, in removing everything in the shape of mystery, the antagonist of confidence, and in impressing these points on his board or council of masters, so that they shall publish fully their work, and that of the men employed by them. The more he can educate his masters respecting his particular business, and invite their assistance, the easier becomes his work.

And yet there is much merit in this well-known old plan of road and street management. Blunder, as they occasionally may, and indulge, as they sometimes may, in a little bit of what is termed sharpness by some people and jobbery by others, there is, on the whole, a vast amount of sound commonsense ruling the decisions to which these bodies of Englishmen generally arrive, and they not only check each other, but can and do exert a control (which is not infrequently necessary) over the desire of a surveyor to carry out work which would cost more than the ratepayers of a locality could well afford. The surveyor, not being a tailor, is apt to attach too little importance to the measure of the cloth and the size of the coat, too often rejoicing in having received authority to execute work which may, nevertheless, be of very questionable advantage to the public.

The problems of road management in England are ripe for solution, an immense stimulus having been given to the whole matter by the Local Government Act of 1888. They do not lie in a nutshell, but comprise questions of general policy, of general finance, of local taxation, of local geologic and lithologic circumstance, of the habits and wants of the people, of the various kinds of transport, including that very vexed one of the transport of goods on roads by means of heavy engines: these are problems which are still further complicated by the difference in the conditions of rating to which urban and rural populations are subject, and again by the special legislation which affects the different descriptions of roads. There is another point also which presses very closely on the attention of people at present. Highways are most importent feeders of railways, and highways have in many parts of the country been greatly improved in the last decade at a very great cost to the ratepayers, many of whom are producers of something marketable; but whilst the cost of transport by road has, by the increased ease of traction, become somewhat lighter, that of goods by railway has recently been increased, so that the producer is no better off than before, after having been heavily rated for improved roads. If it is an unavoidable policy that the railway rates should be, or nearly be, as recently amended, then relief must be given by larger State subsidies or grants for the maintenance of the highways, and this is probably the soundest policy to pursue.

These problems are being wrestled with earnestly and energetically by many clear-headed and clear-minded men, and their determination may affect very much the position in the future of surveyors of rural highways. The opinion which appears to be gaining most ground is that simplification would be of advantage, firstly, in the matter of management, one organisation in each county (excluding urban districts) being sufficient, cheaper, and less complicated than the present dual arrangement; secondly, in the matter of classification, many holding that the term "main," as applied to some roads, is no longer legally necessary, roads being roads in England whatever may be their size; and thirdly, in the matter of repayment of the cost, *i.e.*, what proportion should be borne by the Exchequer of the State and what proportion by the individual payer of rates for the whole of the roads in each county. How this simplification can be effected if Parish Councils are to be introduced it is not at present easy to see, unless those bodies are exempted from interference with the roads, but as the roads are so very much a matter of local concern, such exemption seems illogical; consequently, all attempts at simplifying the management of the roads of England would, in such an event, be rendered additionally difficult, and retrogression would be inevitable, with the usual concomitants of wasted funds, worse roads, and general discontent.

But whoever may be engaged in inquiring into, or may be desirous of grappling with these difficult problems, will find much to help him in the perusal of Mr. Byrne's Text Book, which is a masterly compilation by a very competent engineer—a member of a profession which will have to be be called on more frequently in future for the conduct of a business for which their training and experience especially fits them; for if those problems be solved in the manner indicated above, the work of the Surveyor of Highways will be merged into that of County Engineer, very much on the lines already adopted in several of the counties of England.

GOOD FRIDAY WEEK.—Next week we go to press a day earlier than usual. All communications for the Editor should reach him by *first post on Wednesday morning*, except lists of tenders, which will be received up to 10 a.m. of the same day.

CONSTRUCTIONAL IRONWORK.—Messrs. Dorman Long & Co., of Middlesbrough and Westminster, inform us that they have opened a yard at Nine Elms-lane, Vauxhall, for the purpose of keeping a stock of all the girders they roll and several other sections of steel. They add that all their girders are made from "Siemens Martin" steel.

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LIGHT AND AIR AT THE INSTITUTE.

THE discussion at the Institute on the report of the Science Standing Committee on the Law of Light and Air was somewhat wanting in grasp. That report suggested under its ninth head that no building erected after a certain fixed date shall acquire any rights of light. In other words, the committee recommend the abolition of the Law of Light. In its terms that recommendation applies to the whole country, but in the discussion at the Institute it appears to have been considered that it should only be applicable to London, and that the County Council should be asked to bring the proposal before Parliament. Such a limitation is as illogical as it is half-hearted. If it is right that this particular species of property should be abolished, it should be ended in every town in the country. There is absolutely no reason why the legal change should be confined to London. But we are bound to say that it is quite certain that such a measure would never pass through the Legislature unless it were based either on the Report of an influential Royal Commission, or on a general demand of sufficient force and volume to carry a Bill through Parliament. It is disappointing to find a body of able professional men debating the subject in an academic manner, and apparently blind to the great difficulties which are before them. For a great number of years the indefeasible right to light and air, after the lapse of a certain number of years, has been, so to speak, a legal property. An attempt to abolish it might be regarded as an invasion of the rights of property, and unjustifiable, except on strong grounds of public convenience. But at present the committee of the Institute has given no evidence of either a public demand or great public inconvenience resulting from the existing law. It is true, no doubt, that the law as it stands has prevented the erection of the very high buildings which are to be found in America. But there are large numbers of persons who consider that this result of the law is a beneficial one, and that if its abolition resulted in the multiplication of high buildings, it would be a public misfortune. We do not in any way desire to prejudge the question; we simply desire to make it clear that in asking that the easement of light should be abolished, the Institute is preparing for itself a difficult task, and must expect to encounter a very strenuous resistance. When we come to the other part of the report, upon which most of the discussion at the recent meeting of the Institute turned, we are again struck by its boldness. For the committee recommend that as regards disputes in relation to easements of light, the parties should be forced to go to arbitration; in other words, that there should be a compulsory system of arbitration. This has been hitherto unknown. When parties to a contract agree that disputes in relation to it should be settled by arbitration, there is a voluntary submission in the first place. But to declare that two persons, strangers to each other, who happen to disagree about their rights in regard to a particular property shall, whether they like it or not, submit their dispute to arbitration, is a suggestion which is without precedent. We by no means say that such a law would not be best for the persons concerned, but is it likely that the Legislature will ever say that persons are not to seek for redress before a legal tribunal if they wish? Therefore, we regard this proposal as one which it is almost useless to discuss, because we do not consider that it can ever receive the sanction of the Legislature. Looking, however, to the details of the report, we are struck by the fact that while compulsory arbitration is recommended, it would be neither expeditious nor cheap, which should be the chief advantage of arbitration. In the first place the tribunal is too large; in the second, as an appeal is allowed from it, there would not be that finality which is one of the chief reasons why litigants should go before an arbitrator. As we read the report there is even a final appeal to the High Court of Justice, and once a case arrived there we should expect that it might go up to the House of Lords. Therefore, the report does not even promise finality and economy. But, as we have already said, there are two radical objections of a very practical kind to both branches of the report. To that in reference to the abolition of the easement, that it would be opposed to the whole current of English law for many years, and be regarded as an attack on property; and to that on arbitration, that it seeks to deprive persons, whether they like it or not, of their legal right to resort to a court of law, which is an inalienable though a costly privilege of the English citizen.

NOTES.

IN another column we publish a letter signed by more than twenty Fellows of the Institute, protesting against the course proposed to be taken by the Council in suggesting that after a certain date every person desiring to be admitted a Fellow of the Institute shall have passed such examination or examinations as may from time to time be directed by the Institute. We must say that we are in entire sympathy with this protest. That candidates for admission as Fellows should give satisfactory evidence as to their executed works, and submit photographs or drawings of these for the information of the Institute, as proposed in the first resolution to be submitted to the special general meeting on Monday, is a proposal which is reasonable and practicable; and certainly we are entirely in favour of laying stress, more than has hitherto been the case, on the architectural gifts and acquirements of a candidate for Fellowship, and not electing any one merely because he is shown to be what may be called a "respectable practitioner." But the idea of instituting a formal examination for the election of a Fellow is absurd; it is introducing a practice which has never been heard of in any Society of this type before, and the passing of such a measure would be a fatal mistake, which would only tend to lower the dignity and standing of the Institute, and to keep the highest class of men out of it.

THE anniversary of Schinkel's birthday (March 13) was celebrated with the usual ceremonies and banquet by the Berlin *Architekten-Verein*. The chief speaker of the evening on this occasion, however, for once refrained from giving his audience the usual memorial paper on some details of the great artist's life, preferring to substitute a highly instructive report on the development of Berlin during the last half century, *i.e.*, since Schinkel's death.* Dr. Holrecht, the City Engineer, was the speaker who may claim the honour of having made the ceremony a more interesting one than usual, and we must congratulate him on the able way in which he treated his extensive theme in the fewest possible words. At the banquet the Government was represented by the Minister of Public Works and the Rector of the Royal Technical College, both of whom made some important remarks on local affairs.

THE landslip at Sandgate does not seem to have increased much since the first few days of the disaster. According to the official report of Mr. Walton, Engineer to the Local Government Board, who was deputed to examine the area affected, the disturbance was felt along the foreshore for a length of about 2,800 ft., and it extended on to high ground for a short distance inland. Between high and low water marks there are visible signs of a slight upheaval, a layer of blue clay being obtruded through the line of fracture, and fresh water was in some places issuing from the cracks. The whole of the ground affected north of the main road appears to consist of a *débris* of a former landslip, and the strata consist of fine loam, greensand, and layers of clay. In all, seventy-four houses have been injured, more or less, some beyond repair, and ninety-four houses have been vacated; the majority of them have little or no foundations. Referring to the probable cause of the disaster Mr. Walton states that the rainfall for February was abnormally copious, as much as 2·31 in. being recorded as having fallen in one week. During the last few months the water in the subsoil has behaved in an erratic manner, springs becoming dry, and so forth. On previous occasions there have been minor subsidences, and several houses were patched up. He arrived at the conclusion that the cause was due to the sudden release of impounded subsoil water. We do not find any evidence, however, that at the time of the disaster more water than usual burst forth from the ground, and we cannot say that the report of the inquiry is as full as could be desired. It is stated that the inquiry was held under very disadvantageous circumstances, as there were no recorded observations of the levels of the subsoil water, no sections of the cliff or of the foreshore, and no geological plan. With reference to the latter, we may remark that an expert should know where to put his hand upon an authoritative geological map of the district, so that is no excuse. We do not know what value the Local Government Board places upon a report drawn up in such a hurried fashion and on such inadequate data as the one under consideration, but for our own part we consider it is almost worthless.

A CASE of great interest to contractors and workmen engaged in the building trades has just been tried at Leeds before Mr. Justice Chitty and a special jury, and the result will undoubtedly supply food for thought for the officers of trade unions. It appears that the workmen in Hull have for some time objected, and with reason we think, to the system of sub-contracting, and is in their opinion conducive to sweating and jerry-building. In order to stop the practice the members of three trade unions framed a rule, known as "Rule No. 9," and in June, 1892, they succeeded in getting it accepted and signed by the President and several representatives of the Master Builders' Society. Mr. Joseph Temperton, builder and merchant, of Hull, apparently broke this rule, and negotiations between him and the unionists failed to induce him to conform. Thereupon the unionists began an attempt to compel him, and in so doing they contravened the law. The attempt to compel Mr. Temperton is expressed in the following resolution, which was passed by a committee representing the three unions of bricklayers, plasterers, and labourers:—

"Resolved, that this committee advise the three societies to abstain from using any lime supplied by merchants who are supplying any builders who are working contrary to the joint working Rule No. 9, and, further, that they refrain from handling or fixing any artificial stone work made by any man who is working contrary to Rule No. 9."

In consequence of this resolution, builders who had ordered materials from Mr. Temperton were compelled to cancel their orders, as union men refused to fix the materials, and Mr. Temperton himself was unable to obtain supplies of lime, as the Hull merchants could not have dealings with him without offending the unions. Under the circumstances Mr. Temperton felt constrained to bring an action against the president and secretary of each of the three trades unions for the purpose of recovering damages and of obtaining an injunction to restrain the unions from pursuing their system of boycotting him. The

* Schinkel died on October 9, 1841.

case was opened at the West Riding Assizes, Leeds, on Friday last, and was not concluded until Tuesday. The judge, in summing up, put the following questions to the jury:—"1. Did the defendants or any of them maliciously induce Brentano, Gibson, and Woods, or any of them, to break their contracts [with plaintiff, for the supply of materials]? 2. Did they or any two or more of them maliciously conspire to induce persons named and others not to enter into contracts with the plaintiff, and were such persons thereby induced not to make such contracts?" The jury, after half an hour's consideration, returned an affirmative answer to each question, and assessed the damages to plaintiff at 250*l.*; and the Judge granted an injunction to restrain the defendants from endeavouring to induce any one to break contracts with the plaintiff, or to prevent persons entering into contracts with him. Counsel for the defendants remarked that there would undoubtedly be an appeal against the judgment. It is not likely, we think, that the judgment will be reversed. If it be upheld, the officers of trade-unions will have to proceed very warily in future.

SIR ALBERT ROLLIT, M.P., who presided over the Annual Conference of the Associated Chambers of Commerce this week, gave expression to a feeling which seems to be spreading in the House of Commons as to the methods of conducting business in that assembly. This feeling is not confined to either political party, and is the outcome of the increasing representation of commercial interests in the House, and the natural impatience with which the commercial mind regards the interruptions and delay to business occasioned by our time-honoured method of procedure. The Railway Commission was also condemned; being pronounced, as at present constituted, nearly useless. It was indicated in our article on Railway Rates last week that this feeling existed, and Sir Albert Rollit declared that it was a matter for consideration whether the Commission should be ended or mended. The railway rates question naturally occupied a prominent place in the speech made at this conference by Mr. Mundella, who remarked upon the striking change effected in the attitude of the companies by the events of the past few weeks. The work of revision is going on briskly, and the strain upon the railway officials at headquarters is now being shared by the station agents and clerks, who are finding it very difficult to keep pace with the alterations in rates, classification, and conditions. After spending much time in attempting to familiarise themselves with the new arrangements, they have now to unlearn them again. The task before them, together with the work involved in arranging refunds, and readjusting outstanding accounts, may well induce them to wish, with the public, that the managers had "let well alone."

THE question of erecting a new Royal Library at Berlin has again been the subject of some discussion in the Prussian Upper House. The historical Library on the Opera Place, next to the late Emperor William's Palace, has long been insufficient for the demands made on it, and will have to be given up at the latest about three years hence. Much difficulty had been experienced in finding a suitable site for the new building in close proximity to the University, but this has now been apparently overcome by the proposal to pull down the old home of the Prussian Royal Academy, the Royal stables, and the barracks of the Prussian Body Guard, and to utilise the ground for the new library in conjunction with the proposed new head-quarters of the Prussian Royal Institution and Royal Academy. Professor Ende, at the request of the Government, has been preparing designs for this site, and it may be interesting to note that the main idea for housing some 5,000,000 books has been taken from Washington. The situation of the proposed block would be an excellent one. The main frontage, which would be given to the Royal Academy and Royal Institution, would face the principal thoroughfare, Unter den Linden, whilst the side and back façades, given to the library, would face the broad Charlotten and Dorotheen streets.

THIS year Berlin is again to have an International Art Exhibition, which is expected to be an unusually good one. The management of the Exhibition is in the hands of competent artists, who represent the Royal Academy of Arts and the *Verein Berliner Kuenstler*. This time Professor Becker, President of the Prussian Royal Academy, holds the chair, with Professor Hans Meyer as Honorary Secretary, and Architecture, for once, is well represented in the committee by Professor Ende, the Vice-President of the Royal Academy. The usual outline of the former Exhibition "programmes" has been adhered to, and hence, as far as architects are concerned, there will be special facilities which permit them to submit photographs of their work, and not necessarily only drawings. The Exhibition will be opened on May 14, and will be closed on July 30. Exhibitors have to send in their work between April 12 and 25, after which latter date the hanging committee of 13 members will commence its operations. A number of the medals and diplomas will be given by the Emperor, who will be advised in the distribution by a special committee. It would be well if English architects, as in 1891, would contribute some of their old Academy drawings or other illustrations of modern work. As there are no regulations as to frames, and the expense of freight to Berlin is now nominal, there is no reason why we should not be well represented.

THE *Journal of the Franklin Institute* for February contains a valuable paper upon Manganese Steel by Mr. H. M. Howe, in which the author deals with the properties of hardness and ductility possessed by an alloy of iron containing from 3 to 20 per cent. of manganese. The tensile strength, and more especially the ductility of manganese steel, is seen to vary as the percentage of manganese varies. The steel is made by stirring together the molten thoroughly decarburised product of the open hearth or Bessemer process, and molten, highly heated, rich ferro-manganese. Care has to be exercised to avoid loss of manganese and to keep down the proportion of carbon. When the proportion of manganese rises above 7 per cent., the ductility increases, until the manganese reaches about 13 per cent. Steel containing some 7 per cent. of manganese is so hard that it can be used for cutting iron; and lathe tools made from it have been successfully employed, but steel containing 13 per cent. of manganese is far from hard enough for this purpose. By hardness is meant the resistance to indentation and abrasion. Sudden cooling is found to harden carbon steel greatly, and may make it so hard that it scratches glass readily, while if it affects the hardness proper of manganese steel at all its effect is so slight as to be detected only by delicate tests. Sudden cooling tends to lessen, and if very sudden may quite destroy the ductility of carbon steel, leaving the metal as incapable of receiving permanent set as glass is. Yet the same sudden cooling increases the ductility of manganese steel. Manganese steel, though hard as compared with its ductility, is, however, not as hard as chilled cast iron. The strength and ductility of the steel reach their maxima with about the same percentage of manganese.

THE latest issue of the Transactions of the American Society of Civil Engineers contains a useful discussion upon controverted questions in road construction. Mr. James Owen, the author of the paper, maintains that "the minimum grade should never be less than 6 in. in 100 ft., less than that debarring proper flow of water; the maximum grade for ordinary country and general travel should be easy for an ordinary trotting gait, and he argues that steep grades are neither economical nor good construction." "Good enough" roads require "good enough" repairs and probably will not get them. His experience leads him to the conclusion, that it is more difficult to educate a community to the necessities of repairs, than it is to the necessities of construction. The availability of granite depends upon the amount of mica it contains; the more mica there is in it, the less are its wearing qualities, and gneiss should be debarred entirely. The size most serviceable and giving the smoothest roadway is stated to be at $1\frac{1}{2}$ to $1\frac{3}{4}$ in. Large stone involves a rougher road. Small stone, quicker renewals. One great objection to Macadam is, however, the enormous amount of dust in dry weather.

WE have received a circular from the "Wolston's Torbay Paint Company" calling attention to the qualities claimed for their paint, which, as many of our readers are aware, has long had a high reputation. In place however, of passing over the circular with a mere formal paragraph, we have thought it an opportunity to go into the matter a little more fully, and make a chemical examination of some specimens forwarded at our request for that purpose. The specimens examined were No. 1 "Torbay Brown," No. 27 "Purple Brown," and a terra-cotta colour. These have been subjected to careful chemical and physical examination with the result that they are found to be paints of high quality, drying readily, and possessing a good degree both of opacity and covering power. In their power of resisting the action of heat, steam, ammonia, sulphuretted hydrogen and oxidising agents, they were markedly superior to paints of corresponding colours prepared in the usual way. The claims made by the manufacturers that the paints effectually protect iron from corrosion, stand well on galvanised iron or cement, and are unaffected by intense heat, have been proved by direct trial and experiment to be well grounded. The paints also being prepared from natural iron oxide, are non-poisonous and free consequently from any liability to produce "painter's colic" or other ill effects which so often follow the handling and employment of ordinary lead paints. These paints, already well known and largely used, deserve still more extended application where high class and durable compositions are required.

NOW that Sanger's, formerly Astley's Amphitheatre, is to be demolished, a few words as to its former history may be of interest. Philip Astley, born in 1742, began life as a cabinet-maker. Subsequently, enlisting in the 1st, since the 15th, Dragoons, named after General Eliott (afterwards Lord Heathfield), he served for seven years with great distinction, and on quitting the regiment was presented with a charger by Eliott. With this horse and another he gave exhibitions at Glover's Halfpenny Hatch, by St. John's Church, in the Waterloo-road, and worked, betimes, at his original trade. He then took part of a large timber-yard, by Stangate, at the eastern end of Westminster Bridge (the present site), and also gave evening entertainments at 22, Piccadilly. W. Capon's two water-colour drawings (1777) of the open air circus, "Astley's Riding School," belonged to the Stowe collection; they are now in the British Museum. Having become mortgagee of the entire ground (1780) he covered it over, using the materials of the hustings that had been built in front of St. Paul's, Covent Garden, for a famous Westminster election, and re-opened it by name of the "Amphitheatre Riding

School." That structure, enlarged four years later as the "Royal Grove," was burnt, together with nineteen houses, in August, 1794; rebuilt as the "Royal Amphitheatre," the house was again consumed in a more extensive fire on September 2, 1803. At this time Astley found a rival in C. Hughes and C. Dibdin's "Royal Circus," afterwards opened by T. Dibdin (1816) as the Surrey Theatre. He had great enterprise, building, it is said, nineteen houses of entertainment —including those in Paris and Dublin, with the Olympic Pavilion, which he sold to Elliston—and, as we gather, was his own architect. Astley died in Paris on October 20, 1814, and was buried in Père la Chaise Cemetery. At his son's death in 1821 the circus passed to W. Davis, to whose time the charger survived, and then, in 1824, to Andrew Ducrow, who died in 1842. On June 8, 1841, the house, which contained a large amount of ship timber, was burnt, and rebuilt with a capacity for 2,500 persons, for W. Batty, lessee, by Haward & Nixon, from the designs of Usher, the ring-clown; *teste* Brayley's "Surrey." To Batty succeeded W. Cooke; D. Boucicault converted the house into the "Theatre Royal, Westminster." The lease next passed to E. T. Smith, and in 1873 was acquired by Mr. George Sanger. In Britton and Pugin's "Public Buildings of London," vol. i. (1825), is a view of the then interior, drawn by H. Ansted: the Crace collection contains some views of various dates, comprising the two by Capon; D. Havell's of the building of 1792 (from Brayley's "Theatres of London," 1826, 4to.); Miller's of the building after the fire in 1841; Shepherd's of the east front, as built, *circa* 1846, in what is now Lambeth Palace-road; others will be found in the "Crowle" Pennant.

BUILDERS and contractors, who are constantly having to send large quantities of goods by rail, are more practically interested than most classes in the question of railway charges, and they will therefore read with satisfaction the following letter addressed to Messrs. Adamson & Sons, contractors, of Ealing, by one of the large railway companies, and which has been sent to us for publication:—

"London and South-Western Railway,
Waterloo Station, March 16, 1893.

GENTLEMEN,—With reference to the Memorial signed by yourselves and 115 other firms of London builders, I have much pleasure in informing you that it has now been decided to re-adopt the old rates and conditions, viz., 16 ft. to the ton for Portland and Bath stone traffic in Class B, and I trust this will be satisfactory to you.—Yours, &c.,

CHAS. J. OWENS, Goods Manager."

This is practically a confession that one railway company at least has felt its new position in regard to charges to be untenable; and it seems not improbable that this example will be followed by other companies.

HACKNEY COMPETITION FOR PUBLIC BATHS AND WASHHOUSES.

THIS competition has recently been decided by the Commissioners of Public Baths and Washhouses for the parish of St. John, at Hackney. It was limited to seven architects, who were specially invited, and of these the names of those who were successful alone have reached us. The first premium of £50 was awarded to Messrs. Harner & Pinches, for designs under motto "Compact;" the second was allotted to Mr. F. J. Smith, whose motto was "Otter;" whilst Messrs. Spalding & Cross received the third premium of £20, their design bearing the motto "Practical."

The printed conditions issued to competitors are reticent as to who was to make the award, but we are informed that the Commissioners were confident of their powers of selecting the best design, as they had visited nearly all the public baths and washhouses in the metropolis, and that though Mr. Thornton Green, surveyor, of the Poultry, advised in the matter, the award must only be attributed to the Commissioners. It is a matter of some surprise, therefore, to us that we are able to endorse the award. It appears to have been made to a design which has distinct practical advantages over the others exhibited.

The site is an extensive one, on land at the back of buildings facing Lower Clapton-road and Clapton-square. There is one narrow frontage adjoining the Portland Arms in the Lower Clapton-road, and two of about 25 ft. width in Clapton-square, but one of these frontages in Clapton-square, with the north portion of the site, was reserved in the conditions for future extensions. The accommodation asked for in the particulars was extensive in character, and included a first-class swimming-bath, with water area of 120 ft. by 40 ft., a second-class swimming-bath of 90 ft. by 35 ft. water area, and a ladies' swimming-bath of 80 ft. by 30 ft. water area. The private baths were to include fifteen men's and six women's first-class baths, and forty men's and twenty women's second-class baths, with the necessary establishment laundry, boiler-house, engine-room, and engineers' workshop. The front block was required to face Clapton-road, and here provision was to be made for the main entrance, board-room, clerk's office, and a residence of eight rooms for the superintendent's use. The only remaining point in the conditions that needs to be referred to is the provision of a temporary floor for the largest swimming-bath, with two artistes' rooms, so that in winter a hall for entertainments would be available.

Brief reference only can be made to the designs, which were on exhibition at the Hackney Town Hall on Thursday, Friday, and Saturday of last week.

The motto of Messrs. Harner & Pinches, "Compact," represents one of its distinguishing features, for this design is superior to the others exhibited in its general compactness, the absence of long and tortuous corridors which make administration difficult and expensive, and the provision of one ticket-office for the entrance to all departments. A considerable portion of the site to the north has also been left for future extensions. The ladies' swimming-bath has been arranged with its axis pointing towards Clapton-square. The two remaining swimming-baths, men's first and second-class baths, are at right-angles to the first, with their axis pointing towards the Clapton-road entrance. They are parallel to each other, and between are placed the men's second-class private baths. The men's first-class baths are placed in the south-east corner, whilst artistes' rooms are placed on the east boundary, adjacent to the large swimming-bath. The establishment laundry is placed on the Clapton-square frontage, adjacent to the ladies' swimming bath, and at this point a convenient entrance for stores of all kinds is arranged. The entrance is planned in a convenient way, with a central ticket-office and men's and women's corridors on either side. Behind the office are found superintendent's office, cloak-rooms, refreshment-room, all easily accessible from either corridor. The entrance block on the first-floor has clerk's office, waiting-room, and board-room, and the upper portion of the building is arranged as a commodious dwelling for the superintendent. It is proposed to light the baths by electricity, generated upon the premises. The total cost is estimated at 35,000*l*.

Mr. F. J. Smith's designs, which have received the second premium, under motto "Otter," show the women's swimming-bath and men's first-class swimming-baths, with their axes to the Clapton-road, but the placing of the second-class bath at the end of the former creates an inconvenient length of corridor. The elevations are kept very plain in detail, and their proportions leave something to be desired.

Messrs. Spalding & Cross, who gained the third premium, with designs under motto "Practical," submit the best elevations in the exhibition; they are in good taste and proportion, and show pleasant variety of line. The plan has one or two weak points, one of which is the length of corridor.

The plans submitted under motto "Relsah" are devoid of character and poor as to elevations. The long lengths of tortuous corridors would make administration arduous. The author of this design appears to have adopted as his motto the name of one of the commissioners spelt backwards.

The author of the design under motto "Ariston men hudor" has made a feature of a bath arcade at the Lower Clapton-road entrance, with shops on either side throwing the bath entrance well back. The author of plans under motto "Plan" has aimed at simplicity, and his plan has several good points on this score. The position of the laundry on the east side in a somewhat inaccessible position is against it, as well as the tameness of the elevations. This competition is almost unique in the smallness of the frontages and the consequent lack of opportunity for the display of design in elevations. The award appears to us to have been made to the most deserving set of designs.

COMPETITIONS.

NORTHAMPTON INSTITUTE, CLERKENWELL.—This important competition, after some delay, has been decided in favour of Mr. E. W. Mountford. The three other competitors were placed in the following order: Mr. Rowland Plumbe; Mr. Campbell Jones; and Messrs. Roger Smith & Son. Mr. Charles Barry acted as assessor.

ST. LAWRENCE'S, AMPLEFORTH.—Mr. Bernard Smith, of London, has been selected as architect for the new monastery, church, and additional collegiate buildings which the Prior and Council of St. Lawrence's, Ampleforth, contemplate building. There has been a competition, limited to old boys and architects who have done work for the priests of St. Lawrence on the mission. The new works proposed to be carried out are on a very extensive scale, but we reserve further remarks on the scheme until we publish the drawings, which we shall be able to do shortly.

ARCHITECTURAL SOCIETIES.

BIRMINGHAM ARCHITECTURAL ASSOCIATION.—A meeting of this Association was held on Tuesday last, the President, Mr. W. Hale, being in the chair. A report was presented by the Council on the Building By-laws of the City and their administration, and the secretary was instructed to communicate with the Public Works Committee with a view to obtaining some modifications therein, and in the methods of administering them, which it is thought would lead to much improvement in working. Mr. Herbert R. Lloyd brought under the notice of the meeting the clause in the conditions of competition issued by the Committee of the new Municipal Technical School, referring to the award of premiums, and reserving to the Committee the right to employ an architect other than one of the competitors to carry out the works, and the secretary was instructed to communicate with the committee, pointing out that the clause is derogatory to the profession and likely to prevent some of the invited architects from competing. Mr. J. Ward read a paper on "The Open Fire-place, Past and Present," in which, having dealt at length with the history of the development of the fire-place, from the early open hearth to the modern form of grate, he claimed that for hygienic, æsthetic, and social reasons alike the open fireplace is the best method of artificial heating, and that the best form of grate is that which gives out the greatest amount of radiated heat with the least consumption of fuel. Having dealt in detail with various forms of grate in use at the present time, he quoted the laws laid down a century ago by Count Rumford, and more recently advocated with much vigour by Mr. Pridgin Teale, and advocated from the data thus obtained and from the results of experiments which he had himself carried out, that the points to be aimed at in the construction of the modern grate, are a minimum of metal work, the least possible interruption by bars of the direct radiation of the heat, and the use of fire brick back and sides so arranged as to throw the heat as widely forward into the room as possible. The author concluded his paper by an enthusiastic description of the various advantages possessed by the open fire-place over all its rivals. The paper was illustrated by a large number of designs and diagrams, and by examples of grates.

LIVERPOOL ARCHITECTURAL SOCIETY.—A special meeting of this Society was held at the Library, Cable-street, Liverpool, on Monday last, Mr. A. Harrison occupying the chair, when a paper was read by Mr. R. J. Angel, entitled, "A few notes on hot-water supply." The lecturer's remarks were illustrated by diagrams.

THE ENGLISH IRON TRADE.—Business in crude iron is again quieter, the temporary spurt having fallen away, and in Cleveland, prices have reverted to their old level. Finished iron continues to be dealt with only in hand-to-mouth quantities; but tinplates display a little more activity. The steel trade remains depressed. Shipbuilders are very dull; but in a few districts engineers report a slight increase in work. The coal trade is quiet.—*Iron.*

ON THE USE OF THE WESTERN AUSTRALIA WOODS, KARRI AND JARRAH, FOR WOOD PAVING.*

THE expenditure on the paving of streets is so considerable, that any information which can be be laid before this Association in reference to materials that can be economically used for such work, will no doubt be welcomed.

The Vestry of this parish has alone spent £36,542 2s. 6d. on 74,370 square yards of wood paving during the last seven years, and further large sums will have to be spent shortly for new works and repaving.

The present practice is to use creosoted deal blocks, costing about 12s. a yard, including 6 in. of Portland cement concrete underneath, these blocks being, on account of their greater durability, cheaper and more sanitary than plain deal blocks.

In June, 1889, a trial strip of Jarrah was laid in Lillie-road, 6 ft. 6 in. wide. This strip is now, after three and a-half years' wear, ½ in., ¾ in., and 1 in. above the plain deal blocks adjoining, although four of the Jarrah blocks show signs of wear or decay to the extent of ⅜ in., ¾ in., and ½ in.; also in February, 1892, about 542 square yards of Jarrah wood were laid in Jerdan-place, at the cost of 19s. per square yard.

Karri wood (*Eucalyptus diversicolor*) is abundant in Western Australia, growing in forests intermixed with Jarrah and Red Gum, and can be delivered at our wharf, close to Putney Bridge, in blocks 9 in. by 3 in. by 4 in. deep. at a cost of 185s. per 1,000. This wood does not appear to have been known in this country until the end of 1892, and it is possible that some of it has already been laid under the name of Jarrah.

Jarrah wood (*Eucalyptus marginata*) also growing as above, can be delivered at our wharf, in blocks 9 in. by 3 in. by 4 in. deep, at a cost of 207s. 6d. per 1,000.

This wood has already been considerably used for wood-paving for some years in London.

The blocks of both these woods at the prices quoted are guaranteed 4 in. deep, but not precisely 9 in. long or 3 in. wide, although 1,000 of them would cover a larger area than 1,000 exactly the size specified. The slight variation is due to imperfect sawing arrangements in Australia.

At higher prices they can both be delivered the precise sizes required.

The woods belong to the same class of tree, and appear from the plan of the forests which have been shown to me to grow side by side. Their appearance is very similar, and their similarity would also probably extend to their durability, and to the special immunity from decay which has been claimed on their behalf. As far as the experiments hereafter referred to have extended, one great difference appears to be that Karri sinks in water and Jarra floats, showing Karri to be denser.

Great virtue is claimed for Eucalyptus oil,—prepared from a tree of the same class (*Eucalyptus Globulus*)—as an antiseptic, and it has occurred to me that perhaps the lasting properties of these woods may be to some extent due to the presence of this oil.

The following information is placed in a tabular form for purposes of comparison. The figures are obtained from "Timber and Timber Trees," written by Mr. Thomas Laslett, Timber Inspector to the Admiralty:—

Table I.—Averages.

Description of Work.	Deflection in Inches. With apparatus weighing 390 lbs.	Deflection in Inches. After weight removed.	Deflection in Inches. At crisis of breaking.	Weight in lbs. required to break each piece.	Weight in lbs. required to break one square inch.	Tensile Experiment. Direct Cohesion in lbs. per square inch.	Crushing strains. In Tons.	Crushing strains. In Tons, per square inch.	Classed at Lloyd's.
Karri.....	1·01	·04	6·06	862	215	7,070	6 in. cube 185	5·14	12 yrs.
Jarrah	3·21	·133	4·71	685	171	2,940	2 in. cube 12·762	3·198	12 yrs.
Teak.....	1·65	·083	5·37	912	228	3,301	2 in. cube 11·35	2·838	14 yrs.
English Oak ...	3·37	·189	7·35	776	193	7,571	2 in. cube 13·625	3·406	9 yrs.
Fir.....	1·62	·066	5·14	876	219	3,231	2 in. cube 12·687	3·172	...

The results in the following table are obtained from experiments made with blocks shown to you to-day:—

Table II.

	After being kept in office several weeks near fire shewed.	Contents of blocks dry.	Weight dry.	Weight in lbs. per cube foot.	Specific gravity.	Increase in weight per cube foot after 72 hours immersion.	Increase in bulk of specimens after immersion.	Proportionate increase in bulk from expansion after immersion.
		c. in.	lbs. ozs.			lbs. ozs.	in.	
Karri blocks 9 in. × 4 in. × 3 in. ...	Numerous small cracks.	418·6	15 4	62·911	1·0077	2 13	9·7	·0231
Karri block 9 in. × 5 in. × 3 in. ...	.....	...	...	65.0	1·0412	...	...	...
Jarrah blocks 9 in. × 4 in. × 3 in. ...	Some fine cracks.	434	13 13	51·96	·832	4 12	16·0	·0368
Jarrah block 9 in. × 5 in. × 3 in. ...	.....	...	...	56·0	·897	...	...	...
Deal blocks 9 in. × 4 in. × 3 in. ...	Large openings extending across blocks, and blocks warped.	432	8 4	33	·52	5 12	10·	·023
Deal creosoted blocks 9 in. × 4 in. × 3 in. ...	A few slight cracks.	440	11 4	45	·72	4	25·	·056

* A Paper by M. James P. Norrington, Assoc. M. Inst. C.E., Surveyor to the Vestry of Fulham, read at the recent Metropolitan meeting of the Incorporated Association of Municipal and County Engineers.

The results show Karri to sink in water, Jarrah to float, and that Jarrah absorbs more water and swells more freely than Karri. The author calls attention to the extraordinary expansion of the creosoted blocks. No doubt these blocks lost a great deal of creosote during the weeks they remained in a warm room, and perhaps the pressure they had been subjected to in the cylinder during the creosoting process in some way accounts for their greater expansion.

Considerable feeling appears to exist in Australia as to the relative capabilities of the two woods, Karri and Jarrah, and a Commission on the subject was appointed in 1887, which arrived at the following conclusions:—

"1. It is very certain that the usefulness and durability of both timbers depends very much upon the locality where grown, and the season of the year in which it is felled. The Commission consider that from November to May or June, or when the sap is down, is the best time to undertake this work; this applies equally to Jarrah or Karri.

2. From the lengthened tests and life in works to which Jarrah has been subjected, it appears to be a timber suitable for piles in marine structures. Karri piles, as compared with Jarrah, can scarcely be regarded as having passed the experimental stage; and the Commission would suggest that a series of experiments be commenced and continued year by year with both timbers under exactly similar conditions, careful inspection being made from time to time, and true records kept.

3. From the evidence appended, it appears that the advantages of Karri over Jarrah are:—That piles can be obtained of greater lengths, straighter, they drive better, and resist a heavier strain. For the superstructure of bridges, jetties, &c., or where severe strains or crushing weight has to be considered, Karri, in consequence of its greater strength (see appended Tables) should be preferred and used before Jarrah.

4. It does not appear from the evidence before the Commission that there is much to choose between the two timbers as far as their ant-resisting properties are concerned.

5. From the evidence before the Commission, and the appended Tables of Tests, we are of opinion that Karri is most suitable for works of construction, railways, and public works generally; but as regards the timber resisting the action of salt water and sea worms in marine works it has yet to be proved.

6. It appears, from structures that have been examined, and from the evidence taken, that, as a general rule, round piles should be used in preference to square, and they should be charred and tarred before being driven.

(Signed)
CLAYTON T. MASON, M.Inst.C.E., *Chairman.*
WILLIAM ROGERS, M.Inst.C.E.
FRED STAFFORD, M.Inst.C.E.
H. ERNEST PARRY, Assoc.M.Inst.C.E.
JAMES GARDINER, Assoc.M.Inst.C.E.
JOSEPH HARRIS, J.P., Inspector of Forests."

Test of Karri and Jarrah as Wood Paving.

In July, 1888, strips of Karri and Jarrah were laid side by side in the King's-road, in front of Messrs. Ransome's premises. These blocks were all exactly 5 in. deep, and Messrs. Ransome have kindly shown me samples which have been retained by them. The Karri blocks were 2⅛ in. wide, and the Jarrah 2⅞ in. These blocks have been down now four years and a half without being disturbed, and Mr. T. W. Higgens, the Surveyor of Chelsea, writes me that the Karri is a quarter of an inch above the Jarrah, and the Jarrah is about three-quarters above the yellow deal.

On December 14, 1892, the importers of Karri wrote this Vestry, saying that they would be prepared to guarantee that 4 in. Karri blocks shall last twice as long as the deal blocks (laid in July, 1885, in the Fulham-road), which are not yet taken up, though in a very bad condition. Judging from the blocks in the King's-road the offer appears a safe one, and in the following table the duration of Karri wood is calculated sixteen years.

The importers also claim that a 3½ in. wood block is equal to a 4 in. Jarrah.

In a report to my Vestry, dated January 11, 1892, the following table, showing the relative cost of using the woods named and conclusions appeared:—

Table III.—Cost of Repaving Fulham-road, Concrete Already In.

Description of Wood.	Area Square Yards.	Price per Yard.	Total Cost.	Probable duration.	Average Annual cost of repayment of loan at 3½ p.c. spread over period of duration of wood.
		s. d.	£		£ s. d.
Karri Wood, 9 in. × 3 in. × 4 in. deep	12,500	10 6	6,562	16	534 12 0
Jarrah, 9 in. × 3 in. × 4 in. deep		11 6	7,187	14	649 5 0
Deal Creosoted, 9 in. × 3 in. × 5 in.		7 6	4,687	8	680 0 8

Conclusions.

1. Karri is cheaper than Jarrah.
2. Table I. shows Karri to be generally superior to Jarrah, and the equal or superior of

all the other woods given in the table. The fact that Lloyd's already class both woods as nearly equal to teak is a strong certificate in their favour.

3. Both woods belong to the same class, and probably possess a natural oil in some degree equivalent in its action to the creosote forced into the deal blocks.

4. The King's-road experiment shows Karri to be more durable as a paving material than Jarrah.

5. Table II. shows Karri and Jarrah to be both cheaper in the end than creosoted deal, and Karri the cheaper of the two.

6. A hard wood road is superior to a soft wood road for sanitary reasons, as it throws off the wet better, and is dryer and cleaner.

7. If the harder woods are used, the disturbance of traffic, &c., caused by repeated relaying and repairs will be reduced to the minimum.

The London County Council have already offered to lend money for Jarrah wood paving for seven years to the St. George's Vestry instead of five years, which is the usual term for which loans are granted for wood paving works. If the London Surveyors would combine, no doubt the Council could be induced to lend money for paving with these hard woods for terms of ten or twelve years, which, at present prices, would make the annual cost of hard wood paving much lighter than deal.

One objection raised to the hard wood roadways is that they are more slippery than deal. It is admitted that they are cleaner, and as slipperiness is generally the result of dirt, proper scavenging should obviate the complaint.

A further objection is that the hard woods wear, as Mr. C. Mason, the Surveyor of the St. Martin's Vestry, describes it in a letter to me, like "ripples on a sea shore."

In order to overcome this tendency, the wood paving in Jerdan-place is laid quite close-jointed, and I suggest that this tendency can be further overcome by laying the lines of wood diagonally across the road.

In conclusion, I suggest that when Surveyors are desirous of obtaining blocks for wood paving, they should obtain alternative prices for Karri and Jarrah. This course will enable them to obtain the benefit of the competition for the supply of these woods.

THE BUILDING TRADES' EXHIBITION.

THE Building Trades' Exhibition, which was opened in the Agricultural Hall, Islington, last week, though very far from being anything like an adequate representation of building trade industries, nevertheless contains a few things worth notice.

Fireproof floor construction is represented by two prominent exhibits, viz., those of Picking's Interlocking Fireproof Construction Company, and Messrs. F. Willis & Astley. Of the former, we gave a detailed description in the *Builder* for November 19 last, p. 399, so that it is not necessary to repeat the details here. In both this system of construction and in that of Messrs. Mark Fawcett & Co. (now so largely used) the fireclay "lintels" are tubular. Messrs. Willis & Astley's system, which we had not previously seen, consists in making the fireclay lintels in the form of diminutive girders with a wide-bottom flange and a central web, having its top surface in the form of a segmental curve, so that the web is deepest in the centre and diminishes towards the ends. There is no upper flange, and the webs are pierced with three 2 in. holes to allow of the passage of through currents of air, thus enabling the floor to aid in the ventilation of the room below it. Thin sheets of iron plate are laid over the curved tops of the lintel-webs (which are at right angles to the iron joists), and these sheets of iron serve as a permanent centreing for arched concrete filling-in. One point of these lintels is that main girders and trimmer-joists can be protected by the overlapping bottom flanges of the lintels, which are, of course, grooved on the underside to afford a key for plastering.

Messrs. H. Cunnah, Wright, & Co. show their patent corrugated iron laths and sheets for use in combination with concrete, plaster, and other materials. The laths have a double key for holding the plastic material, and the sheets have their corrugations made, not in the usual wavy or undulating forms, but in a series of grooves of dovetail section. The appliances are likely to be found very useful for partition walls and for a variety of other purposes.

It is indicative of the non-representative character of the exhibition that not a single English building stone, and only one or two of our decorative stones, are comprised amongst the exhibits. There are, however, some excellent foreign marbles and polished granites on view, many of which have only recently been placed on the English market. We noticed a good show of Norwegian marbles from the quarries of Mr. Chr. Anker, of Fredrikshald, which were introduced into this country about a year ago. As is usual with marbles, they bear foreign, usually French or Italian, names—thus the *antique rubané* is a grey and white stone; *jaune rosé royal*, pink and yellow with white spots; *vert Canrobert*, dark green; *gloire*, dark pink with white spots; *vert rosé*, green streaks with red on white patches; *blanc veine*, white with occasional dark grey streaks; *blanc clair* light grey; *citron*, yellow; *antique moucheté*, white background with very dark, interrupted lineations; *bleu tigré*, white with minute grey specks; *brèche*, pink with variously coloured and grey patches. But the most interesting part of this exhibit was the white Norwegian statuary, which, judging from the samples shown, is a very pure white, devoid of streaks or grey patches. This material presents considerable analogy with certain kinds of Carrara statuary, and is a welcome addition to the market. Messrs. Garstin had a good exhibit, comprising a large number of marbles and polished granites, mostly from the Continent. The majority of these are already well-known and need not be referred to, but we observed two remarkable and comparatively new stones termed "granites" which have come from Norway. One is a dark green stone with small black patches; mineralogically it consists of labradorite felspar in large crystals the cleavage planes of which reflect the light, producing a pearly lustre; a considerable quantity of magnetite is present. The other stone is similar to the last, except that it is lighter in tint, and contains less magnetite, As decorative materials, these will doubtless play an important *rôle* in a certain class of buildings, for rarely have we seen such gorgeous effects in natural stone. The presence of so much magnetite, however, in the dark variety is a drawback, for it indicates that the stone is not adapted for out-door work, as that mineral disintegrates with tolerable facility in the open air, and produces unsightly brown stains. For indoor work it will be extensively used. Altogether, Messrs. Garstin's was the most comprehensive exhibit of decorative stones. Another stand was devoted to the various kinds of Cipollino and other marbles from Saillon, near Saxon, in Switzerland, which were described a short time since in our columns.* We need only remark now that there was a polished monolith column of the Cipollino exhibited, 15 ft. in height, which is destined to adorn the principal reception saloon of the new Pump Room at Clifton. The circumstance that this column was shaped and polished by hand, and not turned by machinery, is clearly visible on its surface, which is somewhat irregular in places. Speaking generally, the specimens of Cipollino shown were badly polished. Messrs. Braby exhibited several kinds of marble, fitted up as washstands, &c. An Irish flagstone from the quarries of Messrs. John Hampson & Co., at Kilrush, Co. Clare, formed a novel feature, inasmuch as it is desired to induce London Vestries to use it. The material is a fine-grained, dark-grey sandstone, with clearly marked laminæ; it is exceedingly compact and rough in appearance, and should wear well. For years it has been successfully used in Dublin, Belfast, and other cities in Ireland, and is said to be 15 per cent. cheaper than York flagging.

Bricks of various makes and for various purposes are exhibited by Mr. T. Freeman, the contents of whose stand are worth attention and examination in detail. Close by there is a good show of wall and encaustic tiles from the Brockley Tile and Mosaic works. Messrs. E. & C. Braby have also a good display of tiles.

Messrs. Dick Radclyffe & Co. exhibit a method of constructing walls of buildings for horticultural and other purposes with hollow glass bricks of varied shape and colour. One possible field for the use of this method of construction is in the walls of corridors, where only borrowed lights are available. We believe this is a French invention.

Messrs. Joseph Robinson & Co. exhibit specimens of their well-known plaster work. Parquetry is shown by Turpin's Parquet Floor Company and by Mr. H. Bassant. The Patent Cork Pavement Company show specimens of their compressed cork pavement. Mr. E. S. Hindley shows portable engines; and the Britannia Company, Colchester, show their revolving-table band-saw, for cutting handrail wreaths, &c. There are several "safety" window-sashes, including Ford's, the "Bräloo," and Hough's. The St. Pancras Iron Work Company exhibit iron staircases and pavement lights, and Messrs. Barnards, of Norwich, a small but attractive stand of stoves and overmantels. Messrs. Walter Monnery & Co. have a good representative show of builders' hardware, including stoves, mantels, and wall-ties. A very simple device for enabling lead pipe to be bent without kinking, flattening, or marking is shown by these exhibitors. It is known as "Billing's patent device for bending pipe," and consists of a spiral spring which is inserted in the pipe before the latter is bent. Finally we may mention that Messrs. Bedford Lemere & Co. have a very good display of fine photographs, including interiors and exteriors of several notable mansions.

The Exhibition will close this (Saturday) evening, March 25.

* See *Builder*, vol. lxiii. (1892), p. 472.

SCREENS, THEIR TREATMENT AND SYMBOLISM.*

IN the treatment of these examples we have the germs of splendid opportunities of this kind of screen design. Constructional screens thus designed have the advantage of being permanent effective and open, whilst still retaining all the symbolism of the screen.

I have attempted this kind of treatment in a somewhat varied form. First, at All Saints', West Dulwich, which is illustrated on the walls with all detail. I have carried my chancel arch to nearly the whole height of the building, *i.e.*, over 60 ft.; have fiilled the upper portion with tracery, supported on two moulded shafts; I tie the whole together with a wrought-iron tie screen, with sliding slots to allow for expansion and contraction, elevating my large cross of over 9 ft. high in the centre compartment. Whether this effect is satisfactory I must leave those to judge who best know the church. I can only say that I shall never regret having tried the experiment, for the first time I believe, on so large a scale.

Should the members of the Association like to visit the church during one of their Saturday outings, I shall be very pleased to show them over, and my friend the vicar, who is present this evening, would, I am sure, be equally pleased to see them.

I have again tried this effect in my design for a church at Staines for Sir Edward Clarke, Q.C., which is just going to be carried out. In this the rood is constructed as an actual part of the building.

In designing of stone screens, generally my advice is—don't make them too heavy and massive—don't make them the means of shutting out a good view of the sanctuary. Be careful to have your detail refined without being weak, remembering that the screen is always under close observation. A beautiful lightness and richness can often be imparted by cutting your panel tracery in complete, or nearly complete, relief—and even in very shallow position, apparent depth can be increased by undercutting at the back of your cusping. As regards colouring, I will speak of that later on under decoration generally.

Wood screen work is, again, a large enough subject to be treated entirely by itself. There are so many exquisite examples thoughout the country, that it is a difficult matter to select the best.

I have chosen subjects for illustrations from various counties, but I must say principally from my native county Devon.

The screens or Devon and Somerset stand, I think, unsurpassed as regards beauty in the wood carvers' art, as the Norfolk and Suffolk screens stand unequalled in the richness of their coloured decorations.

From the selection before you I would ask you to particularly notice the following: Harberton, 1st, for its pure and fine detail; 2nd, the extremely happy way in which the traceried ornament is carried round the columns, giving continuous unity of effect. The screen is brilliant with golden colour, and saints adorn the lower panels. This screen has been restored and restored well.

Staverton, with its magnificently carved rood-loft, is a simply beautiful example of modern carved work.

Kenn, with its restored rood crucifix and attendant figures.

* A paper by Mr. G. H. Fellowes Prynne, F.R.I.B.A., read before the Architectural Association on the 10th inst. *(concluded from p. 213).*

Littleham, for the richness of its lower panels.

Plympton St. Maurice, restored by the late Mr. J. D. Sedding.

And last, but not least, the elaborate rood and parclose screens at Dartmouth.

Dunster, Somerset, restored by the late Mr. Street (notice especially the treatment of the rood-screen) Newark, the loft at Sleaford in Lincolnshire.

Again, the exquisitely decorated screen at Ranworth, Cawston, and several other screens in Norfolk are remarkable for the richness of their colouring, as is also the beautiful Suffolk examples of Southwold. Lancaster parish church has some very fine screen and canopy work.

East Church, Kent, is a fine example of one of the thirty rood-screens of that county.

The Church of St. Mary, Woodleigh, Devon, where I found the remains of the old rood in the soffit of the chancel arch, is an interesting example.

Much beautiful screen work as there is remaining in our parish churches, still, vast indeed must have been the destruction of stone, wood, and even metal screens. Who, with any love for our church or art has not lamented to see the sad results of work wrought by sacrilegious hands at the time of the Reformation?

> That violent commotion which o'erthrew
> In town and city and sequestered glen,
> Altar and cross, and church of solemn roof,
> And old religious house—pile after pile.

In designing wood screenwork be especially careful not to vulgarise or get coarse detail, and never forget material with which you are designing is wood and not stone. The detail of the one will look weak and feeble if applied to stone, and *vice versa*. Stone detail applied to wood generally looks both coarse and vulgar.

Don't think I am simply asserting a truism, it is really a fault that is fallen into far too often, and I have seen several examples where oak pulpits have been actually copied in stone with simply disastrous effect.

I think it questionable whether it is wise to keep on designing screens with heavy rood-lofts, for our churches. The lofts cannot in most places be used, and to me it seems somewhat purposeless to copy a Mediæval idea simply because it is Mediæval—by all means have rich canopy work and other elaborate treatment which may suggest itself, but I feel that the heavy rood-loft with its galleried front, deep carved cornice, and groining under, seems to unnecessarily block up the church. A clergyman once remarked to me, that when he entered a church of this kind, the heavy rood-loft seemed to strike him like a bar. I can quite understand the feeling.

There have been a large number of very beautifully designed screens in modern times. I illustrate one or two examples, one of a charmingly simple treatment by Messrs. Bodley & Garner, at the Eton Mission Church, Hackney Wick, and another at Saint Paul's Church, Morton, Gainsborough, by Messrs. Micklethwaite & Somers Clarke.

The spirit, however, in which the old screens were designed should enter into our modern work. It is summed up in inscription seen on so so many screens—

> Let fall down thy *ne* and lift up thy *hart*
> Behold thy maker on yond cross all to torn
> Remember his woundes that for thee did smart
> Gothyn without syn and of a virgin borne.

The rood beam treatment does not seem to have been so common in England as elsewhere. There is a beautiful example of loft thrown across from wall to without screen under, at Avesbury, Wiltshire, here illustrated.

Some of the modern rood beams have been finely treated, and I think in the design for the new church at Miles Platting, Manchester, by Mr. Leonard Stokes, is very finely treated; as is also that in the new Roman Catholic Church of the Holy Rood, Watford, by Mr. Bently, whose work is so truly devotional.

There are two sketches of suggestive treatment recently published in the *Builder*—first, of St. Stephen's Chapel, Westminster, and the high altar screen at Westminster, by Mr. H. W. Brewer, which are well worthy of careful notice.

Before leaving the subject of wood screens, I must refer to the beautiful example of seventeenth century screen at St. John the Divine, Leeds—a screen erected about 1632. The whole of this church is full of beautiful woodwork of that period.

Now as regards metal screen work, a subject again teeming with interest and worthy of the closest study, of which here I can only touch the fringe

Two of the best known of the many beautiful Gothic examples still existing are perhaps, first, the screen or the tomb rail at St. George's, Windsor; second, the ironwork of Queen Eleanor's tomb at Westminster; and there are other numerous examples of grille work at Westminster and elsewhere. France has many beautiful examples, of which the screen at Amiens is an excellent specimen. The grille at St. Martin's, Brunswick, and Jesuit's Church, Cologne, are but small examples of the quantity of beautiful work to be found in Germany. In Spain we find splendid examples at Seville and Toledo. The finest collection of iron-work for exhibition is perhaps that brought together at South Kensington Museum, where one can study the beautiful examples for many hours.

With regard to design I would say, don't try to produce difficult mouldings in metal work. Imitation of wood and stone treatment in metal, as seen in some iron screens of this century, is utterly wrong. For the ready production and strength good horizontal lines in the upper part lessen the difficulty in making a screen. The insertion of panels in considerable number, which can be perforated or worked to almost any design, give great firmness to the work, and are easily fitted.

Nor in any large work is it desirable generally to to use more than one metal. Of course, in small work, which can be got at easily, this remark does not apply. Should variety of effect be required, this may best be obtained by gilding, that is in the case of ironwork.

But brass and ironwork mixed, if not carefully treated often seems to have a patchy effect. Brass when allowed to oxidise for a long time becomes rotten from the zinc used in its manufacture. The brass of the sixteenth and seventeenth centuries stands better than the modern metal, because it was made in a better manner, that is, without so much zinc in it, in fact it was more like bronze. Therefore, if thought advisable to use more than one metal I should advise bronze or copper. Bronze figures can be fairly cheaply introduced with very beautiful effect, and I cannot help thinking that there is a great future for bronze work of this kind, as it is more lasting and often more effective.

There is as good work in these days turned out from the anvil as in past times. Among other modern work, I must especially name the beautiful screen from Mr. Pearson's design at St. John's, Red Lion-square; St. Michael's, Leeds; grilles at Truro; and elsewhere; also the screen at St. Swithin's, Bournemouth, designed by Mr. Norman Shaw.

One of the great faults found in the designing of ironwork seems to be from the general want of knowledge of proportion and sizes of the iron used, and the consequence is that great heaviness and clumsiness is often the result. A good plan is to have a good number of pieces of iron, both square and circular, in your office for reference.

Treat your work simply, without over-ornamentation, always use collars instead of screws, where possible, and don't file up your work on completion.

A paper on the treatment of screenwork would not be complete without some reference to colour decoration.

1st. As regards stonework, some consider it a sin to use colour for decorated stonework. I am by no means ready to join in this condemnation. Stone screenwork can be decorated with equal value as any other material if it is only treated properly; but it must be treated boldly and without fear, and, I must add, with some knowledge of the nature of the colours used. Totnes, as I have before said, is a beautiful example of this kind of work.

The examples that we have of coloured woodwork are so numerous that it is unnecessary to dwell upon this subject beyond saying that one should not be afraid of using strong colours, and not falling into the error of depending upon dull æsthetic colours so much in vogue at present. In the dull light of our churches bright colours well-harmonised are best.

From many examples I have seen, I am fully convinced that the early decorators never feared the use of primaries, or what we might call gaudy colours, but they knew well how to harmonise the colours they used, and where necessary to tone down their colouring to a lower key.

The decoration of ironwork is a somewhat difficult matter, but gilding is, I think, the best treatment. Mr. Pearson shows us the effect of an entirely gilded screen at St. John's, Red Lion-square.

At St. Peter's, Plymouth, I have attained a good effect by first painting the screen in a deep dull red, and gilding on the face only, except in the case of the collars or bands, where the gilding was carried round.

In the time I have before me it would be useless for me to attempt to go further into detail, or to name the very numerous beautiful examples of screens existing both in England and abroad. My only hope is that the few outlines given as to the history, treatment and symbolism of screens, will be sufficient to inspire and increase our interest in this particular branch of work.

In the limelight views I bring before you, I have chosen examples of considerable interest, most of which you will find well worthy of study, including the rood screen at St. Mark's, Venice; interior of St. Miniato, Florence; the Cathedral, St. Paul's, and St. Jacques, Antwerp; the Cathedral, Bruges; St. Etienne du Mont, Paris; Amiens, Chartres, and Vire; the Cathedral, Ulm; Lincoln, Exeter, Chester, St. Alban's, Manchester, Lichfield, Salisbury, Ely, and Hereford Cathedrals; Dartmouth, and Harberton rood-screens, and some constructional screen work referred to in my paper.

I must give my best thanks to Mr. Walter Millard for lending me his well-known sketches of screen work. I must also thank Mr. Hems, of Exeter, who has done so much screen work in Devon and elsewhere, for the old carved work and photographs of screens kindly sent. Also Mr. John Singer, of Frome, for the useful photographs of metal screen work here exhibited. In conclusion, I would add just a few remarks on the design of church work and its details generally.

Don't let the purely artistic or æsthetic side be alone your guide in design. Much less allow the assertion of self, or your own individual cleverness, be your main motive. And, above all, don't look upon your work from a merely business standpoint. No; let something higher and more nobly underlie your design. Look for and try to find an underlying symbolism in all church design. This, more than anything else, will give a poetry and devotional effect to your work, that will show itself and make itself felt in every detail.

Feel how great is the honour of being allowed to design a house or any portion thereof for the honour and worship of the Great Architect of the Universe. Let the one great aim and end of your work be summed up in the words, "Ad Majoram Dei Gloriam."

In the discussion which followed,

Mr. Walter Millard said he had great pleasure in proposing a vote of thanks to Mr. Prynne, not only for his excellent paper, but for the great trouble he had gone to in bringing the subject before them by means of illustrations and lantern-slides. As to the subject itself, it was a wide one, and it was difficult to know where to begin to discuss it. For his own part, he much preferred almost any old screen to any new one. The feature of the old screens was, of course, the means of access to them. If we were not to have rood galleries, and we were not to use them, we did not want any staircases to them, and that fact alone made a great deal of difference in the whole structure of the building. In the majority of the old churches one could find staircases, or traces of them, leading to the rood-loft, and the staircase was, of course, one thing which we missed in modern churches. The thickness of the old screens was another point worthy of note. Many of the old screens were double, and were very fine in effect. The front plane of the tracery was relieved, so to speak, by the shadow underneath, and the effect of that was to make the thing very much more part of the whole building. Of course, if we did not want the screens to carry galleries above them, there was no need for thick and heavy construction, and that was, perhaps, the excuse for using iron so much in the present day, seeing that the screen was nothing more than a railing separating one part of the church from another, and capable of being seen through.

Mr. E. P. Warren said that Mr. Prynne's paper had led them in the most interesting way through a very large and interesting field of study, viz.: From the early Gothic screens to the Classic screens of the Low Countries. He had illustrated and referred to a great many of his (the speaker's) old friends. He (the speaker) had a very strong predilection for screens, and he thought that a church was never furnished without a chancel screen, and that remark applied more particularly to a church which had no chancel arch. It was in churches with a continuous roof, such as St. Peter Mancroft, Norwich, the large churches at Bury St. Edmunds, and other churches of the East Anglian type, that the use of the chancel screen showed itself to the

greatest advantage. In those churches are obtained the full *silhouette* effect, which was to his mind the great beauty of a screen. Just as he considered a church to be unfurnished without a screen, he considered a screen to be unfurnished without a rood. He thought that amongst the many modern architects who had treated screens successfully, none had treated them more successfully than his old master, Mr. Bodley. He thought that one of the most successful modern screens was that in Mr. Bodley's church of St. Augustine, Pendlebury. Another good screen, though on a smaller and humbler scale, was that by the same architect in the Eton Mission Church at Hackney Wick. The whole of the screen was in deal, painted deep red. It was so designed as not to hide the view of the altar—an important point to be observed in the design of a screen—and it gave that sense of security which was one of the objects of a screen, for he did not see what was the use of a screen, unless it gave a sense of enclosure. It seemed to him that one of the great charms of a screen was the *silhouette* effect which was to be obtained by placing an object against the light, and partially hiding and partially revealing what was beyond. People often objected to a screen because it hid the choir. Well, in his opinion, they might vary a familiar old maxim and say, in church, "little boys should be heard and not seen." He thought that the bases of screens, should be 4 ft., or 4 ft. 6 in. in height, as an average minimum. He was glad that Mr. Prynne advocated the use of colour, even on stone. The old stone screens at Stebbing and Bardfield bore evidences of having been coloured; indeed, it was the custom in the old days to colour the whole of the interior of the church, even the tracery of the windows. While speaking of the use of colour on screens, he should like to remark that he did not believe it would be possible to understand the mouldings of some of the screens he had seen, unless it were borne in mind that they were designed to be decorated. With regard to metal screens there were some splendid examples in Europe, many in Spain, and the iron screen round the tomb of Maximilian, at Innsbruck, was a very fine example. One important metal screen which Mr. Prynne had not mentioned was the bronze screen surrounding the tomb of Henry VII. in Westminster Abbey, which he thought must have been embellished with colour and gold. An interesting proof of the use of colour in screens was that afforded by the end of the rood beam discovered in St. Albans Abbey, when it was undergoing one of its spasms of restoration. When the beam was sawn off, the end of the beam was left in the wall, where it had remained for upwards of four centuries, and the colour had been well preserved. The colours were by no means primary and glaring; they were soft and beautiful and extremely rich in tone. The mediæval usage seemed to have been to use the primary colours—for example: to use vermilion where a red was wanted, and then to varnish the colour down by successive coats of varnish to the tone which they wanted to give it. He could not agree with what Mr. Prynne had said as to the gilding of Mr. Pearson's screen in the church of St. John the Divine, Red Lion-square. He thought that Mr. Pearson had forgotten that his reredos was entirely gilt; and the result of having a gilded screen in front of a gilded reredos was that the *silhouette* effect so desirable in a screen was entirely lost. He thought that Mr. Prynne had hardly been severe enough on the Hereford Cathedral screen, which was one of the most disagreeable and unsatisfactory works of the kind which he knew.

Mr. Leonard Stokes said he had very great pleasure in seconding the vote of thanks to Mr. Prynne for his admirable paper. He thought that a screen could be made a most useful piece of church furniture, and the more general use of chancel screens in churches would perhaps cause clergymen to be less frightened in leaving their churches open for inspection. Mr. Prynne had sub-divided his paper into three sections, treating respectively of stone, wood, and metal screens; he (the speaker) should be tempted to put wood in the first place, and he thought that anyone who was going to make a screen for the first time should be advised to do it in wood. After having executed a few wooden screens, one in stone might be attempted; but metal screens last of all, for he thought they were very difficult to manage with success. Indeed, he did not think that he had ever seen a modern metal screen that he should like to look at twice, although the old metal screens somehow seemed generally very well worth seeing.

Mr. Sydney Vacher, in supporting the vote of thanks, said that as to constructional screens of the type mentioned by Mr. Prynne, going up to the roof, he thought it would be a very difficult thing, if not altogether impossible, to arrange the lofty openings so that they should harmonise in their proportions with the arcading of the church.

The Rev. Mr. Beeby, Vicar of St. John's, West Dulwich, said he should be very happy to show the members of the Association his church, so that they could judge for themselves what he could not but regard as the very satisfactory effect of the constructional screen there.

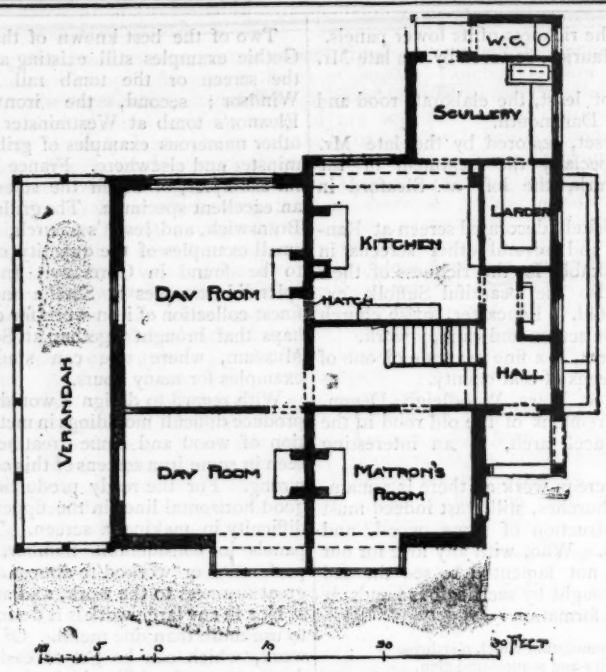
The Chairman (Mr. H. O. Cresswell, President) in putting the vote of thanks to Mr. Prynne, said he had brought the subject before them in a very novel and interesting way. In regard to the question of constructional screens of the type described by Mr. Prynne, he (the President) confessed that he sympathised in the view which Mr. Vacher seemed disposed to take of them. For his own part he had always looked upon a screen as being more in the nature of a piece of church furniture than as an integral portion of the building. With regard to stone screens, he thought that they were always more applicable to large churches and cathedrals. Wood seemed to him the more natural material to use, or metal, if a man knew how to use it, which, unfortunately, not very many did. It had been his good fortune to see, in course of progress, the screen which Mr. Bentley had designed for a church at Watford. He should be very glad if, on some future occasion, the Association would be able to visit Watford to see that church. Last year the Association tour in Somersetshire was taken through a part of the county where they saw a very large number of screens, many of them very fine ones, the rood-lofts in many cases still remaining. One of the features that struck him in regard to those screens was the great breadth of effect which was obtained by carrying them right across the church, and not across the chancel merely.

The vote of thanks having been heartily agreed to,

Mr. Prynne briefly replied, saying that he should be very pleased at any time to show them the church at Dulwich, and he thought that the views of some of them as to the difficulty of treating a constructional screen would be somewhat modified when they saw the one which he had attempted.

The meeting then terminated.

THE ANTIQUITIES OF HEREFORDSHIRE.—The antiquaries of Herefordshire are, says the *Birmingham Argus*, taking measures to preserve the historical relics in which their county abounds by forming a new archæological society. According to the journal named, it is high time to be doing something of the kind, for not long ago a Herefordshire vicar burned an old Jacobean table which had been in the church for 250 years, "in order that it might not fall into secular hands." In another parish an Elizabethan chalice was discovered in the house of the parish clerk, who maintained that it had been given to him by a former vicar.—We notice from a letter in the *Hereford Times* for the 18th inst. that an archæological map of the county is in progress.



Convalescent Home, Chatham.—Plan.

Illustrations.

FRIEZE, GROCERS' HALL.

THIS illustration shows a portion of the frieze which has been modelled by Mr. E. Roscoe Mullins for the new buildings for the Grocers' Hall. The frieze is 2 ft. 9 in. in height, and runs round the two drawing-rooms, having a total length of 200 ft.

The subject, which was chosen by Mr. H. C. Boyes, the architect to the Company, represents the pageant at the entry of Charles II. into London, when there was a procession down Cheapside to which each of the City Companies contributed thirty riders, each with his attendant, the ensign of the company being carried at the head of each contingent. The sculpture refers to the portion of the procession provided by the Grocers' Company.

The frieze will be executed in plaster tinted, in low relief (nowhere more than an inch). The illustration is photographed from the plaster model.

NEW PREMISES OF THE "DISCONTO GESELLSCHAFT," BERLIN.

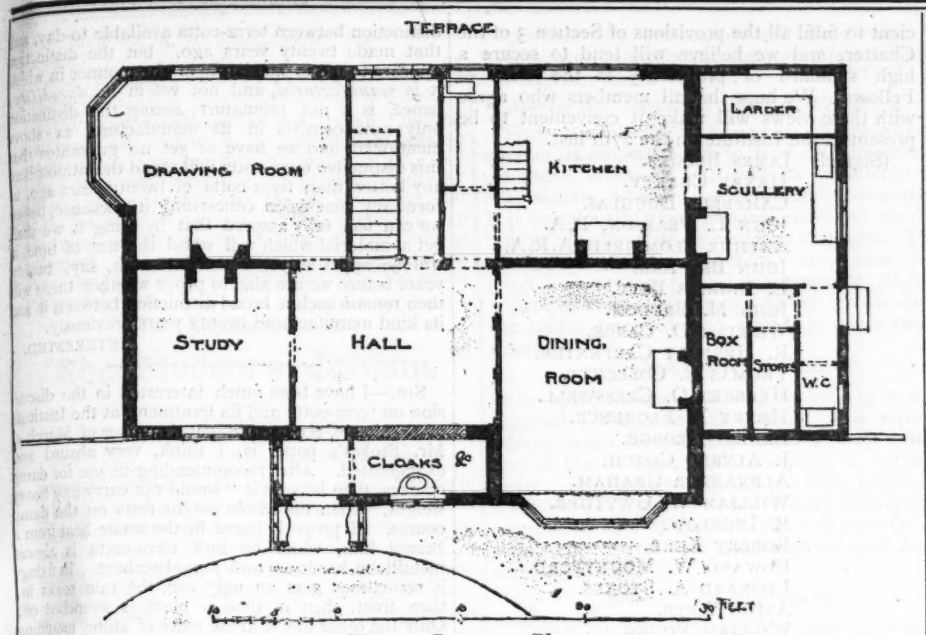
OUR illustration shows an extension to the old Disconto Bank building, which is situated in the historical Behrend Strasse. The façade we illustrate, however, in reality the new rear elevation to the block, faces Berlin's main thoroughfare, "Unter den Linden" (which runs parallel to this street) and has a most prominent position there as neighbour to one of the late Emperor William's palaces.

The plan of the new premises scarcely calls for attention further than to remark that the ground floor is used for transaction of business with customers, that the first floor is occupied by the managing directors and their private secretaries, and that the whole of the second and third floors have been given to the clerks of the bookkeeper's department. The basement floor is taken up by some extensive strong rooms, part of which are for the use of the general public on a system not unlike that adopted by our safe-deposit companies.

The material used for the façade is a dark red freestone of most agreeable colour, and the plastic and wrought-iron ornaments to it have been picked out with gold in the old Dantsic style.

The architects are Messrs. Ende & Boeckmann, or, as German courtesy has it, "the senior assistants 'Regierungs-Baumeister' Hartung and Herr Kleinert, under the supervision of their chiefs Messrs. Ende & Boeckmann." It appears that in large architects' offices in Germany it is the usual custom, where a building has been practically worked out by an assistant architect on the staff of the firm, always to give his name in conjunction with that of his principals; a practice which is well worthy of imitation in this country.

Though the façade shown here has rather a one-sided appearance, from its being an extension to an existing building, it is nevertheless of some special interest, as it forms a very typical example of the style of street architecture now in favour in Berlin, for buildings where limitation of expenditure is no special object.



House at Royston.—Plan.

No. 24, SOUTHAMPTON BUILDINGS.

This building, which adjoins the Patent Office, has been rebuilt for Messrs. Carpmael & Co., the well-known patent agents, whose offices have occupied the same site for upwards of sixty years.

The front of the building is executed in Portland stone, the doorway being in polished granite, the entrance hall is paved with marble mosaic, the staircase is of walnut with teak treads, and the building is lighted with the electric light throughout.

The works have been designed by and carried out under the superintendence of Messrs. Charles J. & C. Herbert Shoppee, architects. The contractors for the general works were Messrs. H. Burman & Sons, of Sharsted-street, Kennington Park. The granite was supplied by Messrs. J. Whitehead & Co., the mosaic paving in the entrance hall by Mr. J. F. Ebner, and the electric lighting has been carried out by the "Brush Electric Light Company."

CONVALESCENT HOME, CHATHAM.

THIS house has been lately erected to be used as a small Convalescent Home upon an open country site near Chatham, by Mr. George Winch. It is intended to accommodate five patients, with rooms for the matron and servants' offices.

The work was carried out by Mr. Filley, builder, of Chatham, the materials being red brick rough cast, plastering and plain tile roofs. The architect is Mr. John Belcher, and the drawing was exhibited at the Royal Academy exhibition of last year.

HOUSE AT ROYSTON.

THIS house has been lately erected at Royston for Mrs. E. Barley by Messrs. Gimson & Co., builders, of that town, the materials employed being red brick and plain tiles for roofs and hanging.

The architect is Mr. John Belcher, and the drawing was exhibited at the Royal Academy of last year.

ARCHÆOLOGICAL SOCIETIES.

DUMFRIES AND GALLOWAY ANTIQUARIAN SOCIETY.—At the last meeting of the Dumfries and Galloway Antiquarian Society there was read a paper by Mr. John T. Johnstone, Moffat, on "The Roman Road in Upper Annandale." Mr. Johnstone stated that three sections of the road had been opened up to the west and north of the town of Moffat, the principal excavation being made on the Chapel Hill. The road, according to the *Eskdale Advertiser*, was found to be 21 ft. wide, with a whinstone kerb along each side. From foundation to crown it was 23 in., exclusive of the turf covering it. As a foundation, there was a layer of clay, with stones bedded on its surface, 6 in. deep in the centre, and tapering to each side, the stones being undressed and pressed from 1 in. to 1½ in. into the clay. Then came a layer of stones, 11 in. deep, with vacancies filled up with "till," the stones being on the average the size of a boy's head. On the top was a layer of smaller stones some 4 in. deep, forming the surface of the roadway. There were some variations in other parts.

ESSEX ARCHÆOLOGICAL SOCIETY.—A half-yearly meeting of this society was held at Colchester a few days since, Mr. G. A. Lowndes, President, in the chair. It was decided to hold a meeting in May at Castle Hedingham, and to hold the annual meeting in July at Southend. The sum of £50 was voted towards the purchase of Mr. George Joslin's private museum of antiquities. Mr. Henry Lever, F.S.A., read a paper on "Recent Discoveries of Roman Remains at Colchester Castle." A *résumé* of the paper appeared in the *Essex Telegraph* for the 14th inst.

WORCESTER DIOCESAN ARCHITECTURAL AND ARCHÆOLOGICAL SOCIETY.—The annual meeting of this Society was held on the 14th inst. The report was read and adopted, and, after formal business, some interesting details of the success of the Worcestershire Historical Society were given by the Rev. J. B. Wilson, the number of subscribers having reached 200. Hopes were entertained that the map showing the landholders at and after the date of the Domesday Book would be shortly undertaken.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of this Council was held on Tuesday afternoon last at Spring-gardens, the Chairman, Mr. John Hutton, presiding.

The Blackwall Tunnel.—Some discussion ensued on the report of the Special Committee (consisting of the Chairman, Vice-Chairman, and Deputy-Chairman) appointed in December last to consider certain suggested alterations in the construction of the Blackwall Tunnel, by which the "cut and cover" system is to be substituted for the compressed air system, which was a part of the original contract in a section of the work, and also as to additional works connected with the lining of the tunnel. The Committee contended that the deviations from the original contract ought to reduce the cost very considerably, but the contractors declined to enter into any negotiations in that direction. The Committee recommended :—

(*a*) "That as regards the substitution of cut and cover for compressed air, the Council do not sanction any alteration in the original contract for the construction of the Blackwall Tunnel without a new contract for the same being entered into.

(*b*) That the Council do instruct the Bridges Committee to further consider the matter of the substitution of concrete for brick lining, there being no immediate necessity to arrive at a decision."

Mr. Campbell moved, as an amendment :—

"That before the Council interferes in the manner suggested, counsel's opinion be obtained as to the legality, with reference to the terms of the contract, of such interference."

Mr. M'Call seconded the amendment, which, after a division, was negatived.

Mr. Rhodes moved a further amendment :—

"That, the questions at issue being for the most part those of modification of construction and of the prices relative to such changes and the methods of carrying such out, it be referred to the arbitration of an eminent engineer or of two eminent engineers, who shall give an absolute award on the premisses, and that Messrs. Pearson be invited to concur in this arrangement."

Mr. Arthur Arnold seconded the amendment, which was supported by Mr. Burns, but ultimately withdrawn.

Sir John Lubbock urged that the Council should not express an opinion upon the report, but send the whole thing, together with the documents, to Sir Benjamin Baker to report. He moved accordingly.

Mr. Harben seconded the amendment.

The Chairman said he was very confident the Council would effect a saving if the matter was looked into, and he hailed the amendment with very great satisfaction.

The amendment was agreed to.

The Erection of Working-class Dwellings.—The debate was resumed on the report of the Public Health and Housing Committee with reference to the erection of working-class dwellings. The recommendation of the Committee was as follows :—

"That the rents to be charged for dwellings erected by the Council shall not exceed those ruling in the neighbourhood ; and shall be so fixed as to provide a net return of not less than 3 per cent. (after allowing for a sinking fund for rebuilding and all outgoings) upon the value of the land (subject to the obligation to erect dwellings upon it) plus the cost of building with ordinary foundations, and that all such dwellings shall be so designed that the cost of erection may not exceed a sum which will enable the Council to carry out the foregoing conditions."

On the motion to adopt the recommendation, Mr. Pickersgill, M.P., moved, and Mr. Branch seconded, the following amendment :

"That, subject to compliance with the building regulations which may from time to time be approved by the Council as applicable to dwellings to be erected by the Council itself, the following principles shall (so far as practicable) be observed : The rents to be charged for such dwellings shall not exceed the fair local value, and shall be so fixed as to provide a net return of at least 3 per cent. (after allowing for a sinking fund for re-building and all outgoings) upon the total outlay of the Council on the erection of such dwellings, such outlay being estimated at the value of the land (subject to the obligation to erect dwellings upon it), plus the cost of building with ordinary foundations ; and all such dwellings shall be so designed that the cost of erection may not exceed a sum which will enable the Council to carry out the foregoing conditions."

After some discussion this amendment was defeated.

Mr. Charles Harrison (the Vice-Chairman) moved, and Dr. Collins seconded, the following amendment :—

"That the recommendation be referred back, with an instruction to the Committee to report—(*a*) The number and cost of the sites acquired under the Artisans' Dwellings Act of 1875, and other Acts, and now subject to the obligation that only working class dwellings shall be erected thereon: (*b*) Whether Parliamentary powers should be sought to get rid of this restrictive obligation upon any of such sites, having regard to the requirements of the surrounding districts, so that the Council may be free to sell or let the land for any purpose. (*c*) And generally, whether and to what extent and in what localities and under what conditions as to rent the Council should exercise the provisions of the Housing of the Working Classes Act, 1890, in reference to the erection or renting of separate houses and gardens outside the area of the County of London, and for what population and in what districts within the county the Council should erect dwellings for the working classes."

This amendment was also defeated, and the recommendation of the Committee was adopted and referred to the Finance Committee in order order that they might bring up a report on the financial aspect of the question.

The Council Preparing to be its own Builder.—The Report of the Works and Stores Committee contained the following paragraphs :—

"*Appointment of Clerk in the Works Department.*—In accordance with the resolution of the Council of 22nd November, 1892, an advertisement was issued inviting applications for the post of clerk in the Works Department at a commencing salary of £200 a year. We have received ninety-eight applications, and, having carefully considered the respective qualifications of the candidates, we are of opinion that Mr. William Franklin Dyson, who has been employed by Messrs. John Mowlem & Co., as chief prime cost clerk since October, 1878, is the best fitted for the post. We therefore recommend—

'That Mr. William Franklin Dyson be, subject to a certificate of fitness by the Council's medical examiner, appointed clerk in the Works Department in the lower section of the first class at a commencing salary of 200*l.* a year upon the following conditions—That he do hold his office during the pleasure of the Council ; that he be required to give his whole time to the duties of his office, and be not allowed to take any private business ; and further, that on retirement he shall not be entitled and shall not make any claim to any retiring allowance under the Superannuations Act, 1866 : and that he will submit to any general scheme which the Council may adopt with respect to insurance for pensions or superannuation.'

"*Central store yard.*—In pursuance of the reference by the Council on November 22 last, we have had under consideration the question of the provision of a central store-yard and workshops necessary for carrying out the works referred to us by the Council. We have made full inquiry, and, after having viewed many premises, have been fortunate

to get the offer of a most convenient wharf at a reasonable price, and without paying any compensation for trade interest or disturbance. This property is known as Bartram's Wharf, Belvedere-road, Lambeth. The wharf contains an area of about 66,000 square feet, has a frontage to the River Thames of about 205 ft., a frontage to Belvedere-road of about 220 ft., and an average depth of 370 ft. There are already on the ground sawmills and buildings suitable for workshops, also stabling for 35 horses. The premises are the freehold of the Ecclesiastical Commissioners, who are prepared to accept a rent 1,500*l.* per annum for a lease of three years from March 25, 1893, and to give the Council the option of purchasing the wharf and buildings thereon for a sum not exceeding 39,000*l.* at any time during the tenacy, The Valuer reports that the terms offered are advantageous to the Council, and we are therefore of opinion that the Council should at once rent these premises with a view to the ultimate purchase of the freehold of the same. It is most important that a store-yard should be at once obtained, for the Council has recently intrusted its jobbing and hoarding and shoring works to us in addition to building works already in hand, and it is necessary to make provision for the storage of the plant and materials necessary for these operations. We recommend:—

'(*a*) That, subject to an estimate being submitted to the Council by the Finance Committee, as required by the statute, the Council do rent the premises known as Bartram's Wharf, Belvedere-road, from the Ecclesiastical Commissioners, for a period of three years from March 25, 1893, at a rent of 1,500*l.* per annum, and that the Solicitor be directed to prepare the agreement.

(*b*) That the Solicitor be directed to insert a clause in the agreement, giving the Council power at any time during the period of the lease to purchase the freehold of the premises for a sum not exceeding 39,000*l.*'

Purchase of Plant.—In view of the proposed occupancy of Bartram's Wharf by the Council, we directed the Engineer to value the sawmill machinery and other plant on the premises, and we instructed the Valuer to enter into negotiation with the present occupiers, who have agreed to sell the machinery and plant to the Council as they stand for the sum of 1,100*l.* It is part of the arrangement that the vendors shall surrender to the Ecclesiastical Commissioners any interest which they may claim to have in the premises, in order that the Commissioners may give the Council vacant possession. The Council having given us authority on February 28 last to expend 1,000*l.* in the purchase of plant, we have now to ask for a further vote of 100*l.* to complete this purchase. We recommend—

'That, subject to a supplementary estimate being submitted to the Council by the Finance Committee as required by the statute, the Committee be authorised to incur a further expenditure of 100*l.* for the purchase of the plant and machinery now on the premises known as Bartram's Wharf.'"

These recommendations were all agreed to, and after transacting further business the Council adjourned at 7 o'clock.

Correspondence.

THE QUALIFICATIONS OF FELLOWS, R.I.B.A.

SIR,—The attention of members of the Institute is drawn to the important question to be decided at the special general meeting on the 27th inst., on the desirability of the examination of candidates for Fellowship. The following "Regulation," unanimously adopted by the Council, will be submitted to the meeting for their adoption:—

"On and after the 1st November, 1893, every person desiring to be admitted a Fellow shall in all cases submit for examination, by and to the satisfaction of the Council, evidence of his abilities as a practising architect, such evidence to comprise working drawings, and, if possible, photographs of his executed works—accompanied by a declaration signed by him that the buildings of which he has submitted drawings and photographs have been designed by himself; and such further evidence, if any, as the Council may, under the circumstances of the case, require."

In addition to this "Regulation" the General Meeting will be asked to decide whether the time has now arrived for the Institute to make the following "declaration":—

"*Declaration of the Royal Institute under its Charter.*

On and after the 1st January, 1896, subject to the power reserved to the Council in section 3 of the Charter, every person desiring to be admitted a Fellow shall be required to have passed such examination or examinations as may, from time to time, be directed by the Royal Institute."

We, the undersigned, are firmly persuaded that such a "Declaration" is undesirable in the interests of Architecture and of the Institute, and is wholly unnecessary. And, further, that the "Regulation" above quoted is amply sufficient to fulfil all the provisions of Section 3 of the Charter, and we believe will tend to secure a high standard of proficiency in the class of Fellows. We hope that all members who agree with these views will make it convenient to be present at the Institute on the 27th inst.

(Signed) JAMES BROOKS.
HENRY CURREY.
CAMPBELL DOUGLAS.
JOHN L. PEARSON, R.A.
ARTHUR BLOMFIELD, A.R.A.
JOHN BELCHER.
E. INGRESS BELL.
JOHN M. BRYDON.
WILLIAM D. CARÖE.
R. HERBERT CARPENTER.
THOMAS E. COLLCUTT.
HERBERT O. CRESSWELL.
HENRY L. FLORENCE.
ERNEST GEORGE.
J. ALFRED GOTCH.
ALEXANDER GRAHAM.
WILLIAM W. GWYTHER.
B. INGELOW.
ROBERT KERR.
EDWARD W. MOUNTFORD.
LEONARD A. STOKES.
ASTON WEBB.
WILLIAM YOUNG.

PROPOSAL FOR A MUSEUM OF CASTS.

SIR,—Why should not a Museum of Casts like that of the Trocadéro in Paris (only better, in that English architectural detail is superior to Continental), be erected as a basement to the proposed Tate Picture Gallery?

JOHN P. SEDDON.

THE INSTITUTE AND TERRA-COTTA.

SIR,—I note with pleasure the re-opening of the discussion begun at the Institute's evening devoted to terra-cotta. With the purely architectural question I am not concerned, but I take the opportunity to say a few words as to the criticism of terra-cotta on the score of its cost.

The instance quoted by Mr. Brydon (that of the Battersea Polytechnic) proves nothing. In that particular building the cost of terra-cotta was greater than that of Bath stone and less than Portland. No general deduction can be made from such a premise, as the question immediately arises, "Was terra-cotta used at its cheapest in the case of the Battersea Polytechnic"? As I had the pleasure of tendering for it, I can inform Mr. Brydon that the large amount of repetition which that admirable building undoubtedly presents was severely handicapped by some expensive non-repeated features. So that the relation of the cubic bulk of terra-cotta to the cost of the necessary models and moulds was not favourable to a low price for the terra-cotta.

As a general principle it may be taken that the cost of terra-cotta will be little below that of stone where the features of a building are plain and of diverse character and the facings are in brick; but if the features are elaborate or much repeated, or there is a large area of Ashlar facing, the cost of terra-cotta will be much under that of stone; whilst if there is elaboration and ornament, coupled with repetition, the cost of terra-cotta will be far below that of the alternative material.

This has been proved over and over again, and I can assure Mr. Brydon and others interested that, although many of the architects who use terra-cotta would do so for its artistic merits alone, they are far too business-like to overlook the question of cost. It rarely happens that an estimate for terra-cotta work is accepted without its having to undergo the ordeal of a comparison of cost with stone.

In making the above generalisations and subscribing for once in a way to the false conditions of comparison of that kind, I have in mind for London work, Portland stone from beds of medium hardness, and for Midland Counties work, the better class sandstones, such as Darley Dale amongst Derbyshire stone, or Park Spring amongst those quarried in Yorkshire. I also purposely set aside for a moment the improved method of direct-work, which I have endeavoured to perfect in order to deal with the problem of non-repeated work, and am now arguing on the ordinary conditions of terra-cotta manufacture.

I do not propose to enter into the comparison with Bath stone, for I cannot think that Mr. Brydon, who deprecates the laboratory of the chemist as an aid to the production of one building material, will seriously champion the cause of another which needs to have sent out with it a chemical substance, "fluate, for hardening and preserving the stone" (*vide* advertisement). That would scarcely be consistent on his part.

S. H. LEECH.

Lambeth Pottery, March 21, 1893.

SIR,—Under the above heading you publish a letter from Mr. H. Huntley-Gordon, and in the second paragraph he says he makes "a broad distinction between terra-cotta available to-day, and that made twenty years ago," but the distinction appears to me to be simply in the manner in which it is *manufactured*, and not yet in its *durability*; hence, is it not premature, seeing the distinction only now consists in its manufacture, as above mentioned, and we have as yet no guarantee that this distinctive terra-cotta will stand the atmosphere any better than terra-cotta of twenty years ago, to form any conclusion concerning it? because, before we can feel fully assured that by using it we shall get a material which will stand the test of time, it will be apparently necessary to wait, say, twenty years before we are able to prove whether there will then remain such a broad distinction between it and its kind manufactured twenty years previously.

INTERESTED.

SIR,—I have been much interested in the discussion on terra-cotta and its treatment, at the Institute of Architects, reported in your number of March 4. Mr. Stokes's paper is, I think, very absurd and exaggerated. After recommending its use for damp courses, then he says it "would not carry any heavy weight," when the whole weight rests on the damp course. If properly burnt in the waste heat from a Bristol kiln, white or buff terra-cotta is almost metallic in hardness and non-absorbent. In fixing, it sometimes gets an ugly rap, the rain soaks in, then frost, then in time a piece is wrenched off. Only the other day a great piece of stone moulding or sill fell from one of the Government offices, nearly killing a passer-by. Now, if he had found fault at the finishing of it, he might, I think, with the same reason have complained at the face of terra-cotta blocks being finished with leather and sponge instead of fine-toothed drags and small tools.

I remember, as far back as 1853, working at Hill Hall in Essex. We had to repair the east front, the Portland stone vases, balusters, coping and plinths being much decayed and loose; we had to refix and make them good in Portland cement. On coming down to the bases of the pilasters that ornament the front, we found on cleaning off the vegetation that they were of terra-cotta, and made by Coade, of Lambeth, date 1790, or 1793, I forget exactly which. The arrises and angles of the mouldings were as sharp as when they were made, and all finished off with fine-toothed tools, as if done yesterday, and that should be the method now.

With regard to vexatious delays, that is very often the architect's fault in not forwarding the drawing sooner. I understand the reasons why builders do not like it on plasterer's work, as it has to be gone over too many times; ordinary brickwork is more to their taste, as it is finished as soon as laid, and the joint struck and then strike the scaffold and cry finished. Terra-cotta, sir, is like steam, a few years ago in its infancy, and has a future before it if properly handled, and as for mortar or cement not sticking to it I would like Mr. Leonard Stokes to try and shift some of the blocks composing the screen to Brighton and Preston Cemetery, or the lodge and boundary railing piers, erected in 1886. Sir, I would be glad if you could find space in your journal for these few remarks in hope of seeing an alteration in the finishing of terra-cotta.

W. A. SYMMONDS.

Ditchling Potteries, Hassocks.
March 11, 1893.

NORMAN ORNAMENT.

SIR,—In your issue of February 25 Professor Aitchison makes an interesting reference to the decorated shafts of the Normans. Can any of your readers furnish a list of the churches in which these chevrons, spirals, and lozenges are to be found decorating the piers? I only know of the following:—Durham, Holy Island, Dunfermline, Orford, Waltham, Norwich, and I think Selby and the crypt of York. In Messrs. Perrot & Chipiez's "Art in Chaldæa and Assyria," vol. 1, p. 278, there is an illustration showing plan and elevation of a façade at Warka, in which the semi-circular pilasters appear decorated with the very same lozenges, spirals, and chevrons which are to be found at Durham. Perhaps this coincidence may be worth noting.

G. H. R.

BUILDERS AND "QUANTITIES."

SIR,—I should like to draw the attention of your readers to the present unsatisfactory, and I might say unfair, position in which members of the building trade are placed, by reason, firstly, of inaccurate quantities; secondly, by building owners not being liable for inaccuracies in the same; thirdly, by persons posing as quantity surveyors, and whose qualifications for acting as such are *nil*.

Perhaps some influential members of the trade or quantity surveyors might see their way clear to take some steps that would tend to place matters on a more satisfactory basis. I note an advertisement in your issue of 11th inst., in which the architect states that his clients will not be responsible for the accuracy of the quantities to be supplied. Of what use are the quantities in this case, as, before tendering, the builder ought in justice to himself to check them, and might just as well take them off himself and save the commission? Ought not quantities (when furnished by or at the instigation

of the architect or his client), to form part of the contract?

I should be glad to hear the opinion of others on this matter. FAIRPLAY.

*** We have always been of opinion that "quantities" furnished" ought to be guaranteed, because ensuring their accuracy is only a matter of time and care. It is not a case of "professional advice" where a man advises to the best of his ability, but where he may be wrong in his judgment; the quantities are a matter of computation, not of judgment; and, as we have before said, if they are not correct they are not "the quantities," but something else.—ED.

The Student's Column.

CHEMISTRY.—XII.

Symbol P. *Phosphorus. Atomic weight* 31.

PHOSPHORUS does not occur naturally in the free state, but, in combination with metals and oxygen, occurs as phosphates. It is most abundantly found as apatite, a phosphate of calcium. Calcium phosphate forms a considerable proportion of bone, and is present in the brain, and in small quantities in the yolk of eggs and in blood. Phosphates are always found in the most fertile soils.

Phosphorus is prepared from bone ash, which consists principally of calcium phosphate. The bone ash is first treated with sulphuric acid, which causes the formation of insoluble sulphate of lime, and a solution of phosphoric acid, containing a small quantity of calcium salt. This solution is drawn off, mixed with charcoal, and evaporated to dryness. The solid mass is then heated to bright redness in clay retorts, when phosphorus distils over and is condensed under water. This crude phosphorus is purified by redistillation, or by melting it under hot water and straining it through chamois leather or layers of charcoal.

At ordinary temperatures, phosphorus somewhat resembles wax in appearance. It is luminous in the dark, and, being very inflammable at a comparatively low temperature, is kept under water. It may easily be ignited by friction, and sometimes by the mere warmth of the hand. The ture of its flame, however, is so low that it is insufficient to ignite a splinter of wood unless tipped with sulphur.

The vapour of ordinary phosphorus when inhaled for any length of time gives rise to a distressing and disfiguring disease of the jaw.

An allotropic modification of phosphorus, termed *red* or *amorphous phosphorus*, can be obtained by heating the ordinary variety to about 240°C. in an atmosphere incapable of acting chemically upon it—such, for instance, as nitrogen.

This amorphous phosphorus is now almost universally used for tipping lucifer matches, because it is not poisonous. It is a brick-red powder, non-luminous in the dark, and is not inflammable until heated to 260°C. When heated to 260°C. it is reconverted into the ordinary variety, and then burns in the usual way, with formation of phosphorus pentoxide (P_2O_5).

Phosphoric Acid. H_3PO_4.

This acid may be obtained as a syrupy liquid or as a colourless solid; in the latter case it is termed *glacial* phosphoric acid. The acid is obtained by treating bone ash with sulphuric acid. It forms a most important series of salts, termed *phosphates*. The "soluble bone phosphate," or "superphosphate of lime, $H_4Ca(PO_4)_2$ which is so largely used as a manure, is one of the most important of these. It is obtained either from bone ash or from "coprolite," a native ore consisting chiefly of calcium phosphate. Phosphate of soda ($HNa_2PO_4 + 12H_2O$) is another salt of much commercial importance.

Phosphorus and Hydrogen.

Phosphuretted hydrogen, hydrogen phosphide, or phosphine $P.H_3$ is a colourless, poisonous gas which possesses an odour resembling that of putrefying fish. It is generally prepared by the action of caustic potash upon phosphorus. The gas is passed through a vessel containing water, and each bubble of gas as it rises to the surface and comes in contact with atmospheric oxygen, takes fire spontaneously. This inflammability is due to the presence of an impurity termed hydride of phosphorus (P_2H_4), which may be condensed by passing the gas through a tube immersed in a freezing mixture, when it will be found that the gas does not take fire spontaneously. It is this gas, given off with a trace of the hydride from putrefying animal matter, which is supposed to produce the celebrated will-of-the-wisp or "ignes fatui" occasionally seen over marsh land and stagnant pools.

Symbol As. *Arsenic. Atomic Weight* 75.

This element closely resembles phosphorus in some of its properties, while in others it resembles the metal antimony. It may be considered as intermediate between the metals and non-metals. It is occasionally found in a free state, but usually combined with other elements, as arsenides. The commonest native arsenides are mispickel ($Fe_2S_2As_2$), realgar (As_2S_2) and orpiment (As_2S_3).

Arsenic is usually prepared either by distilling the native arsenical iron pyrites in earthenware retorts—

$$2Fe_2S_2As_2 = As^*_4 + 4FeS,$$

or by reducing arsenious acid by heating it with charcoal. The arsenic is evolved as a vapour, which, when condensed, forms a very brittle greyish-black mass, and possesses a metallic lustre. It volatilises at a dull red heat, producing a vapour which has an odour usually described as resembling that of garlic. When heated in the air, arsenic burns with a blue flame, and forms arsenic trioxide.

Arsenic Trioxide. As_2O_3.

This is the common arsenic or *white arsenic* of commerce, and is often called *arsenious acid*. It is odourless, almost tasteless, and only slightly soluble in water. The solution is feebly acid, and contains arsenious acid, H_3AsO_3. It is usually sold as a heavy white powder. It is soluble in hydrochloric acid, and is freely dissolved by caustic potash or soda solution. In the latter case it forms arsenites of potassium or sodium.

If sulphate of copper solution is added to one of these arsenites, a brilliant green precipitate, known as Scheele's green, is obtained, through the formation of a copper arsenite ($CuHAsO_3$).

Scheele's green is prepared by dissolving 1 part of powdered white arsenic and 2 parts of commercial caustic potash in 35 parts of boiling water. While still warm, the solution is filtered, and 2 parts of copper sulphate are added to the filtrate. The precipitate which separates out is washed with warm water, and dried. (Spon's Encyclopædia.)

Emerald green may be prepared by boiling 1 part of arsenious acid with 10 parts of water, and mixing it with 1 part of verdigris (copper acetate).

Vienna green is also prepared by mixing arsenious acid with verdigris, the proportions being different.

In each case an arsenite of copper is formed.

The arsenites of the alkalies are soluble in water, while those of the heavier metals, such as copper, and those of the alkaline earths are insoluble.

In addition to the trioxide another oxide, termed pentoxide of arsenic, or arsenic oxide (As_2O_5) is known, and forms, with water, arsenic acid. H_3AsO_4).†

Sulphides of Arsenic.

There are three sulphides of arsenic,—viz., realgar (As_2S_2), orpiment (As_2S_3), and arsenic pentasulphide (As_2S_5).

Realgar is found native in orange-red crystals, while orpiment, which also occurs naturally, is found in yellow crystals. Orpiment is, however, prepared artificially as a bright yellow powder by passing sulphuretted hydrogen through a solution of arsenious acid, or by subliming a mixture of sulphur vapour and arsenious oxide. This trisulphide of arsenic is employed as a pigment, and is called *king's yellow*.

All compounds of arsenic are poisonous. The two most delicate tests for arsenic, Marsh's test and Reinsch's test, have been described in a previous paper.

The Metals.

Having examined the most important of the non-metals, we can now pass on to the consideration of the metals and their compounds. It has already been pointed out that there is no sharp line of demarcation between them, and that the distinction is made for the sake of convenience.

The metals are all solid at ordinary temperatures, except mercury, which is liquid. They all possess the power of reflecting light, and hence are said to possess a metallic lustre, and they are mostly good conductors of heat and light. Some metals, such as antimony and bismuth, are so brittle they cannot be hammered out or drawn into wire; while others, like gold and copper, are so ductile that they can readily be rolled into sheets or drawn into fine wire. Gold is capable of being beaten into leaves so thin ($\frac{1}{280000}$ of an inch in thickness) that the metal becomes partially transparent.

Alloys were believed to be mere mixtures of two or more metals with one another. It has recently been shown, however, that some of these alloys are true compounds—*e.g.*, aluminium bronze ($AlCu_9$).

Amalgams.—When a metal forms an alloy with mercury, the alloy is termed an amalgam.

Oxides.—All metals combine with oxygen to form oxides, and such combination is generally attended with the evolution of light and heat, but the conditions under which the oxidation may be effected vary greatly with different metals. The metals, with the exception of antimony, all refuse to combine with hydrogen alone.

Sulphides.—Sulphur unites with most of the metals to form a sulphide—*e.g.*, lead sulphide, PbS.

Sulphates.—Metals combine with oxygen and sulphur to form sulphate—*e.g.*, copper sulphate, $CuSO_4$.

Nitrates.—Metals in combination with nitrogen and oxygen (NO_3) form nitrates—*e.g.*, mercuric nitrate $Hg(NO_3)_2$. They are all more or less soluble in water, and are all decomposed by heat with the evolution of oxygen.

Carbonates are mostly insoluble in water. They are compounds of a metal with carbon and oxygen (CO_3). Most of them are decomposed into the oxide of the metal and CO_2 by heat, thus $CaCO_3 = CaO + CO_2$.

Chlorides are compounds of a metal with chlorine. All the metals will combine readily with free chlorine—*e.g.*, common salt, NaCl.

Alloys.

Alloys are formed by melting or fusing two metals together. They often exhibit very different properties to those possessed by either of the metals separately, and cannot, therefore, be regarded as mere mechanical mixtures. Thus—

1. An alloy of silver and lead will remain fluid at a considerably lower temperature than pure lead, although the melting-point of silver is three times as high as that of lead.

2. By adding tin to gun-metal, the hardness of the alloy is *increased*, although tin is softer than gun-metal.

3. The specific gravity of an alloy is seldom the same as the mean of the specific gravities (calculated to the correct proportions) of the metals in the mixture.

4. Two parts of copper with one of tin form a hard, brittle, white alloy, although copper and tin are both very malleable metals.

5. The tensile strength of an alloy is usually considerably greater than that of either of the metals composing it.

Brass is an alloy of copper and zinc, the proportions of which are varied according to the quality of alloy required.

The colour of the alloy depends upon the proportion of the copper to the zinc. Thus, ordinary yellow brass contains about 2 parts of copper to 1 of zinc, and if the proportion of copper is increased to 4 parts to 1 of zinc, the alloy assumes a reddish colour, while, if less than 2 to 1, it becomes lighter in colour than ordinary brass.

Ordinary brass is fairly tough and malleable, and can be drawn into wire or rolled into sheets. The presence of iron as an impurity renders it less malleable, and lessens its tensile strength. The presence of small quantities of antimony as an impurity in the copper employed will sometimes render the brass so brittle that it cannot be properly rolled. Brass is, moreover, rendered brittle by continued vibration.

Muntz metal is an alloy of copper and zinc, with a small quantity of lead. It is cheaper than brass and more malleable. It is largely employed for sheathing ships, and occasionally for covering roofs.

Bronze is an alloy consisting principally of copper and tin. Thus gun-metal, ordinary bronze, bell-metal, "copper" coinage, and speculum metal may all be considered as bronzes, because they consist mainly of these two metals.

Solder is an alloy employed for making joints between pieces of metal, the solder forming a fresh alloy with the metal with which it is united. Every solder must, of course, be fusible at a lower temperature than the metal it is to unite.

The composition of solders varies according to the metal it is required to unite, for the more closely the solder agrees with the metal in malleability and hardness, the better will be the joint.

Hard solders are those which require a red heat to melt them, while *soft solders* fuse at a very low temperature.

* The molecule of arsenic is believed to consist of 4 atoms.

† See p. 72, *ante*.

The following table shows *approximately* the percentage composition by weight of the different alloys :—

	Copper.	Zinc.	Tin.	Lead.	Aluminium.	Gold.	Silver.	Antimony.	Bismuth.	Nickel.
Brass, ordinary	66	34	...	...	...	...	...	...	...	...
,, for turning, fitting, engraving, &c.	75	25	...	...	...	...	...	...	...	...
Bronze	91	6	2	1	...	...	...	...	...	...
Bronze coinage	95	1	4	...	...	...	...	...	...	...
Gun metal, for ordnance	90·5	...	9·5	...	...	...	...	...	...	...
,, of maximum hardness for turning	83	...	17	...	...	...	...	...	...	...
,, soft	94	...	6	...	...	...	...	...	...	...
Bell-metal	80	...	20	...	...	...	...	...	...	...
Muntz metal	60	40	...	Very small quantity	...	...	...	...	...	...
,, nails for	87	4	9	...	...	...	...	...	...	...
Britannia metal	1·8	...	89·4	...	...	...	...	7	1·8	...
Aluminium bronze	90	...	...	...	10	...	...	...	...	..
Fusible metal	..	...	19	31	...	...	...	...	50	...
German silver	51	30·6	...	...	...	...	...	...	...	18·4
Gold coinage	8·3	...	...	...	...	91·7	...	...	...	...
Pewter	...	...	80	20	...	...	...	...	...	...
Silver coinage	7·5	...	...	...	...	...	92·5	...	...	...
Speculum metal	67	...	33	...	...	...	...	...	...	...
Solder (fine)	...	...	67	33	...	...	...	...	...	...
Type metal	...	...	...	83	...	...	...	17	...	...
White brass	3	...	90	...	...	...	...	7	...	...
,,	6	...	...	41	...	...	...	41	...	...

With the exception of the coinages, all these alloys vary more or less in composition according to the proportions preferred by different manufacturers. Muntz metal especially varies in the proportions of the two metals it contains.

Phosphor bronze is made of copper and tin together with a very small proportion of phosphorus. By altering the proportions of its constituents, it is manufactured with different qualities.

The following table shows the melting-points and specific gravities of the useful metals and some of their alloys :—

Metal.	Specific gravity.	Melting point.
		Deg. Fahr.
Potassium	0·865	145
Sodium	0·974	207
Aluminium	2·6	About 1,292
Antimony	6·8	797
Zinc	6·86 to 7·1	770
Tin	7·29	442
Iron	7·79	2,732 to 3,280
Nickel	8·8	Somewhat lower temp. than iron
Copper	8·96	1,990
Bismuth	9·90	507
Silver	10·5	1,873
Lead	11·4	612
Mercury	13·6	40
Gold	19·5	2,015
Platinum	21·5	3,280

Alloy.	Specific gravity.	Melting point.
		Deg. F.
Bell-metal	8·0	...
Brass ordinary	8·3	1,840
Gun-metal (9 copper to 1 tin)	8·5	1,990
Steel, cast soft	7·8	3,300
Muntz-metal	8·2	...

OBITUARY.

MR. E. S. HENSHAW.—We regret to have to record the sudden death of Mr. Edmund Simons Henshaw, in his seventy-first year, early on Sunday morning last. He was well known in the building trades by virtue of the official positions which he held in connexion with the organisations of the master builders, but he was never (as so many have supposed) a builder himself. He was the son of Mr. William Henshaw, a silk broker, and was born on January 12, 1823. He was educated at a school in Winchester, and afterwards at Calais. On leaving school he went into the firm of Grant & Hodgson, tobacco brokers, and afterwards was with his uncle, the late Mr. Richard Simons, a wine merchant of Mincing-lane. At the time of the "gold" fever he went to Australia, and on his return again joined his uncle. In 1868, his services were retained in New York by the United States Government in what was known as the "Sherry Wine Case" (which lasted over six months) on account of his knowledge of wines. About the time of the 1872 strike he became connected with the Central Association of Master Builders of London, and it was he who, with Mr. Stanley G. Bird, was mainly instrumental in the successful termination of the strike of masons at the Law Courts in 1877-8. On the introduction of the Employers' Liability Bill he was commissioned to draw up a scheme of insurance, and it was broadly upon that scheme that the Builders' Accident Insurance (Limited) was founded in 1881. Of that company he had always acted as Secretary. At the time of his death he had prepared everything for a meeting of the Council of the Central Association of Master Builders, but when the members arrived it was resolved unanimously "That as a mark of respect to the memory of the late Secretary the further business do stand adjourned until Monday next"; and it was further resolved "That the President be requested to convey to the widow and son of their late Secretary, Mr. E. S. Henshaw, the heartfelt condolence of the members of the Council with them in their sorrow and bereavement, and to express the sense which the Council entertains of the loss which the Association has sustained by the death of their late Secretary, who was a zealous and efficient officer devoted to the interests of the Association and its members, and for whom they collectively and individually entertained the highest regard and esteem."

GENERAL BUILDING NEWS.

"SCOTT'S" RESTAURANT, COVENTRY-STREET.—On the 13th inst., the first portion of the new building of Scott's oyster and supper rooms was thrown open to the public. It will be remembered that the major portion of the premises was destroyed by a disastrous fire in the spring of last year. The portion of the building now opened has been erected on the site of that portion of the premises which was entirely destroyed, the corner block not having been at present rebuilt on account of the necessity of carrying on the business. This will now be proceeded with. The first portion now open consists of basement and five floors. The basement contains a large wine and coffee bar, "The Dive," 40 ft. by 30 ft., entered by a wide staircase descending direct from the main entrance. On this floor are the oyster and lobster stores, lobster boiling room, wine cellars, lavatories, &c. The ground floor is occupied by an oyster bar and grill room, divided from each other by a carved American walnut screen, filled in with etched and brilliant cut glass. The walls of the ground floor bars and grill room are treated in marbles of warm tone, the pilasters being of "red Languedoc," with black bases. The spaces between the pilasters are filled in with mirrors framed in "Jaune Lamartine," with filling of "Pavonazza" around. The marble work is mounted on a base or dado of American walnut, and surmounted by a modelled frieze in fibrous plaster. The fittings are all in American walnut, this material being generally employed for the joinery throughout. The floor of the oyster bar is of white marble mosaic, with black marble dolphins at intervals; the floor of the grill-room being of oak and American walnut parquetry. The first floor is reached by means of a broad staircase leading direct from the entrance lobby, as well as by a second staircase leading from the grill-room. On this floor is a large public dining-room, 45 ft. by 24 ft., with panelled American walnut dado, doors, chimney-pieces, &c. A grill is provided on this floor. The second and third floors are repetitions of the first floor. Lavatories are provided on all floors, also service rooms with rapid electric lifts communicating with the kitchens. On the fourth floor are placed the kitchens, sculleries, and the usual offices, as well as staff bedrooms. The elevations are Early French Renaissance in character, the materials used being polished Labrador granite for plinth and circular columns, bronze caps and unpolished Kemnay granite up to the first-floor window-cills. The whole upper portion is of Monks' Park Bath stone, worked at the quarries of the Bath Stone Firms, Limited, and protected by their "Fluate." The general contractor for the work is Mr. C. F. Kearley, of Kensington and Uxbridge. The following is the list of the sub-contractors :—Carver, Messrs. Daymond & Son; Bath stone, The Bath Stone Firms, Limited; granite, Messrs. Fenning & Co.; marble, Messrs. de Grelle, Houdret, & Co.; decorations and furniture, Messrs. Marshall & Snelgrove; electric light, Messrs. Watson, Gusenheimer, & Co.; wrought-iron and bronze, Messrs. Starkie Gardner & Co.; fibrous plaster, Messrs. Geo. Jackson, & Sons. The building was designed by and has been carried out under the superintendence of the architects, Messrs. Treadwell & Martin, of Waterloo-place. Mr. K. J. Osborne was the clerk of works.

NEW PUBLIC RECORD OFFICE BUILDINGS, CHANCERY-LANE.—Messrs. Foster & Dicksee are getting the scaffolding into position for the purpose of building the superstructure of this building. The fireproof floors throughout are to be on the Fawcett system, the same as those now being put in the new Admiralty buildings.

LIBERAL CLUB, BACUP.—A new Liberal Club was opened at Bacup on the 18th inst. The buildings have been erected and furnished at a cost of 4,824*l.*, and have been built from designs by Messrs. Mangnall & Littlewoods, architects, of Manchester.

NEW INDUSTRIAL DWELLINGS IN WALWORTH.—According to the *City Press*, the Fishmongers' Company are now continuing on their Walworth Estate the erection of model dwellings for the working classes—a work commenced some years since by the company in Paragon-row, Walworth. The Paragon-row block ever since the tenements were erected in 1876 has been always fully occupied. Some old leases of property in Brandon-street having fallen into the Company's hands, the Court some little time ago decided to pull down the houses and erect a block of dwellings. The new buildings, which are now roof high, have a frontage of 75 ft. to Brandon-street. They are being executed externally in bright stock brickwork with red brick strings and mouldings. Entering from Brandon-street by a central entrance into the corridor, suites of rooms lie right and left. The corridor is lit at each end, and also from the staircase in the middle. Each floor contains seven sets of rooms, some consisting of three rooms and some of two rooms. The buildings contain five stories, and give accommodation for thirty-five families, each house or suite of rooms having its own entrance door opening on to the corridors, and the convenience and privacy of individual families have been attained by providing in each suite of rooms complete water, sanitary, and other arrangements, so that in every house even the single room and scullery houses are provided with all the conveniences within their own front door. The buildings have been erected by Messrs. Brown, Son, and Blomfield, from designs prepared by the Company's architect, Mr. T. Chatfeild Clarke, F.R.I.B.A.

NEW BUSINESS PREMISES, WORCESTER.—New premises have been erected upon The Cross, Worcester, for Mr. Arnold Lewis, tailor and outfitter. Mr. Ernest Day, F.R.I.B.A., is the architect of the new buildings, and Messrs. Bromage & Evans were the builders.

NEW SUNDAY SCHOOLS, JOHN-STREET, BEDFORD-ROW.—On the 18th inst., Mr. George Williams laid the foundation stone of these schools, which are being erected from the designs of Mr. F. T. W. Goldsmith, A.R.I.B.A.

FOREIGN AND COLONIAL.

FRANCE.—The State has voted 500,000 francs for the acquisition of certain objects of art from the Spitzer collection, which will be divided between the Cluny Museum and the Louvre.——The jury in the competition for the decoration of the Salle des Banquets at the Hôtel de Ville has selected three artists for the final competition; MM. Georges Bertrand, Prouvé, and François Lafon.—— An exhibition of the works of the impressionist painter Camille Pissaro has been opened in the Durand Ruel Gallery, to close on the 30th.——In the competition for a monument of the defence of St. Quentin, M. Theunissen has been selected as sculptor, and M. Heubes as architect.——The Municipal Council of Paris has voted a sum of 70,000,000 fr. for a certain

number of street improvements, half the amount to be expended on the quarter on each bank of the river.——The Council has also resolved on the raising of a special loan for covering all the expense of the complete sanitary improvement of Paris, including purification of sewage, and the construction of an aqueduct to take the bulk of the sewage to the plain of Achéres, according to the scheme long talked of.——The new reservoir at St. Cloud, to receive the water from the Avre, is to be opened on the 30th, and the water will, before long, be supplied for public consumption.——The project for making Paris practically a seaport is again being much discussed. Many members of the Chamber of Deputies wish to have the project realised for the exhibition of 1900.——The new bridge of Manoir, on the line between Paris and Rouen, has just been completed, about a mile and a-half from the bridge of l'Arche.——The statue of General Kellermann has now been definitely placed on the plateau of Valmy, under the direction of its author, M. Barrau. ——In view of the exhibition to be opened at Lyons on April 26, a metallic tower is being erected on the hill of Fourvière.——The municipality of Montereau has instituted a competition for a new savings bank for that town.——The jury in the competition for two schools at Asnières has awarded the premium to M. Joannis Bernard, architect, of Asnières.——It is annonnced that a stone-built arena is being erected at Dax (Landes) for the combats of bulls, called in the district the "Courses Landaises."——The landscape painter, Louis Cabat, formerly director of the École Française, at Rome, has just died at Paris, at the age of eighty-one.——The sculptor Itasse has died at Hyères at the age of sixty-three. His daughter, Mdlle. Jeanne Itasse, is herself a distinguished artist, and obtained last year a travelling scholarship at the Champs Elysées. M. Itasse was a sculptor of great merit.

BERLIN.—The great annual competition for the Schinkel Studentship has been decided. Herr Karl Moritz, of Messrs. Ende & Boeckmann, receives the first premium; Herr Bruno Werdelmann, of the Leipsic New Imperial Law Courts *atelier*, takes the second. There were five competitors. It has occasioned much remark that whenever a member of the Leipsic *atelier* competes he is sure to merit a premium. Herr Hoffmann, the architect-in-chief, and four of his assistants have gained the distinction in turn; a sixth member of this office would have received the distinction but for his untimely death. —A similar competition for civil engineers, also under the auspices of the *Architekten Verein*, has been won by Herr Max Foerster, of Charlottenburg. There were six competitors.——Besides the large number of churches which are being erected in Berlin for the benefit of the inhabitants, two new ones are to be built for the special use of the military garrison. The designs are by Herren "Bauinspector" Rossteuscher and Reg. Baumeister Menken respectively.——It has always been the rule to put any Government or Municipal building destined for demolition at the disposal of some authority who would find it suitable for scientific or other experiments. In the case of the old Cathedral, which is being pulled down, we hear the Royal Engineers will be allowed to make some blasting experiments on the foundations.——Of the many architectural models destined for the Chicago Exhibition, a very fine one of the new Memorial Church to the late Emperor William is now on view in the *Kunstgewerbe* Museum. It has been made of wood to a scale of 1·25. "Baurath" Schweibten is the architect.——At the annual meeting of the manufacturers and traders in Portland cement much interesting information was given as to various technical points. The papers, &c., will be embodied in the form of a report.——It will be interesting to hear that the only difficulty of any account which may tend to delay the construction of the proposed Metropolitan Elevated Railroad is purely a sentimental one. The congregation of a certain church consider that the proposed railway will spoil the view on to their place of worship as seen from certain points. They have protested against the route taken by the railway, which will now probably have to be changed.

MISCELLANEOUS.

HOUSE-ROOFING IN CHINA.—According to a recent communication made by Mr. Bellett to the Paris Geographical Society, a veritable revolution has been brought about in China in the construction of houses by the adoption of a new method of roofing. Hitherto Chinese houses have been covered with roofs of a very peculiar kind, which cost a great deal, and through their great weight press very heavily on the walls. In addition, the protection afforded against rain is very inefficient. The Chinese are now following the example set them by European residents, and understanding the advantages of metallic roofing, are substituting roofs of galvanised sheets for the old styles. The transformation only commenced a short time ago, and is very rapidly becoming general. In 1890 there were introduced through the port of Shanghai 391 tons 3 cwts. 3 qrs. 20 lbs. of galvanised sheets for roofing, representing a value of 5,155*l.* 12s. 6d. In the following year the quantity of the import rose to 768 tons 12 cwts. 2 qrs. 7 lbs.

EDINBURGH AND ELECTRIC LIGHT.—On the 17th inst., the Lord Provost's Committee of the Edinburgh Town Council had under discussion the report prepared by Professor Kennedy, of London, on the electric lighting of the city. No decision, however, was come to. Some members were desirous of obtaining more information from Professor Kennedy, and others wished to have a fuller report from Mr. David Cook, manager and engineer of the City of London Electric Lighting Company, who has already expressed concurrence with the opinion of the expert. The proposal that the Corporation should undertake the installation was favoured by some, while others were disposed to allow private enterprise to lead the way, and finally the meeting broke up without having come to any resolution.—*Scotsman.*

ROYAL STATISTICAL SOCIETY.—At a meeting of the Royal Statistical Society, held on the 21st inst., at the Museum of Practical Geology, Jermyn-street, a paper was read by Mr. Stephen Bourne, on "Progress of the External Trade of the United Kingdom in Recent Years." The chief object of the paper was to bring down the figures produced by the same writer on previous occasions to the latest date. The external trade is that which originates or ends within the kingdom, and is carried on with places outside its borders. It consists of imports from abroad, and that portion of them which is again sent out of the country, together with the produce and manufacture here which is supplied to customers abroad. The total of these for a period of twenty years shows an average import of 392,000,000*l.*, reduced by the re-exports from them to the amount of 60,000,000*l.* a year, leaving 331,000,000*l.* as the value of those retained for home uses. The exports of British goods is 227,000,000*l.*, leaving 104,000,000*l.* as the apparent annual excess of imports over exports. This excess, however, is reduced by certain deductions from the import side for freights, &c., and by additions to the export side for stores, coals, and other imports not included in the official returns as such. So that one-half of this balance is more apparent than real, and what there is of excess must be much more than met by earnings abroad, and the product of investments remitted home. The continued growth of our trade, and the cheapening of prices, was beneficial to the consumer, though perhaps not equally so to the home-growers. But the diminished value of the exports of British goods, the larger quantities and the falling prices of our products which was witnessed in the figures for the months of the present year, were by no means encouraging. It was not the business of statisticians to forecast the future, but if so inclined the indications afforded by this investigation did not promote its being done with a light heart.

REMOVAL.—Mr. George Wragge, metal casement maker and smith, announces the removal of his London show-room from Surrey-street, Strand, to No. 9, Southampton-row, Holborn, and that he has also taken a show-room at 17, Lower Sackville-street, Dublin.

CAPITAL AND LABOUR.

THE FIBROUS PLASTERERS OF LONDON.—The Committee of the Fibrous Plasterers' Association have issued a manifesto to the fibrous plasterers of London, in which they say:—"The subject which we ask you to consider is of most vital importance to you all. In the first instance, we ask all fibrous plasterers, who are not building plasterers, whether they think it is consistent to join a trade union run entirely in the interests of building plasterers, whose intentions are to oust all of them out of the trade as soon as the building plasterers learn how to produce fibrous plaster, and they can get on without fibrous plasterers? We challenge all fibrous plasterers, who have joined the National Association of Operative Plasterers, to examine their Book of Rules and find one that is of any benefit to them, or in their interests. They will not: because they are all framed in the interests of building plasterers, who hold all offices, and, of course, have framed those rules to suit their trade. We address ourselves, particularly, to fibrous plasterers who have been in constant work for years. Have they reflected how the N.A.O.P. would serve them should they be discharged from their present situations? The N.A.O.P. would serve them, as they have served others, quickly fill their places with building plasterers, and keep the fibrous plasterers walking about, out of work, until tired out they would be compelled to seek some other means of getting a livelihood. This is the experience of others to-day, it may be theirs to-morrow, and unless they try some means to prevent it, will be theirs very soon. The insulting and contemptuous manner in which the N.A.O.P. speak of and treat fibrous plasterers, should leave no doubt whatever of their intention towards them. Should any doubt exist, read what the Organising Secretary says. He said: 'The N.A.O.P. does not recognise any special men whatever; building plasterers only are acknowledged. I speak as a plasterer to plasterers, and in the interest of plasterers. Special men are to go to something else or they must take up the shovel.' Now this applies to fibrous plasterers who are special men; are they willing to come to this? If so, we advise them to join the N.A.O.P.; they can then assist the Association to oust them out of their trade. If they are not, they can now defeat the N.A.O.P. scheme by joining a union representing themselves and their trade. They can then have a voice in making laws and framing rules in their own interests, and pay a small subscription which will be used for their protection and benefit, not against them, and to fight the battles of others, who, if successful, will take all benefits gained themselves." The Secretary of the Fibrous Plasterers' Association is Mr. E. Maskall, 9, Ufton Grove, Southgate-road, N.

"SHOULD THE BRICKLAYER TILE?"—Such is the question which heads a letter in the *Star* of the 20th inst. The writer, who signs himself, "A Slater and Tiler," answers the question in the negative. He says: "Of late years, owing to the introduction of the Queen Anne style of house, tiling has largely taken the place of slating, but as slaters have been brought up to the trade of tiling, the change of fashion has not deprived them of work. Now, however, the Operative Bricklayers' Society are taking steps to compel builders to give the tiling to bricklayers only, despite the fact that bricklayers this last fourteen years have not been brought up to or learnt the trade of tiling, and a great many won't do it at all; driving nails is not their trade. Now, such a change would rob hundreds of slaters and tilers of their legitimate means of livelihood. We say it is a dog-in-the-manger policy. The bricklayers have a far greater share in a building as regards labour than we have, and surely can afford to be content with that fair share. Let bricklayers be what they are called, and stick to their trowels; and let those of us who this last fifteen years have brought up our apprentices and sons, and mastered the art of tiling, be, as we are called, slaters and tilers."

MEETINGS.

FRIDAY, MARCH 24.

Architectural Association. — Paper by Mr. J. A. Gotch entitled, "In Praise of a Country Practice." 7.30 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. F. G. Baily, B.A., on "The Regulation of Direct Current Motors." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Sanitary Law, English, Scotch and Irish; Public Health Act, 1875; Model By-Laws, &c." 8 p.m.

SATURDAY, MARCH 25.

Architectural Association.—Visit to the Battersea Polytechnic, Battersea Park-road, by permission of the architect, Mr. E. W. Mountford. 3 p.m.

Edinburgh Architectural Association.—Visit to (1) Glasgow Municipal Buildings; (2) Glasgow Cathedral.

MONDAY, MARCH 27.

Royal Institute of British Architects. — (Special General Meeting for Members only). (1) Nomination of President for 1893–94. (2) To consider By-laws as to the nomination and election of candidates for membership. (3) To receive the Report of the Council as to the qualification of Fellows. 8 p.m.

TUESDAY, MARCH 28.

Institution of Civil Engineers.—Mr. G. E. W. Cruttwell on "The Pier Foundations of the Tower Bridge." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Professor A. Wynter Blyth on "Sanitary Laws and Regulations Governing the Metropolis." 8 p.m.

Carlisle Architectural, Engineering, and Surveying Association.—Mr. C. Lonsdale on "Brick and Tile Making."

WEDNESDAY, MARCH 29.

Carpenters' Hall, London Wall.—Mr. J. Wolfe Barry on "The Tower Bridge." 8 p.m. (Admission free.)

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

3,081.—FIRE-PLACES: *R. J. Lee.*—This invention refers to what is claimed to be an improved blower and draught regulator for open fire-places. It is a combination of two parts, one to fit in front of the fire-place, closing to some extent the area above the bars, and acting as an ordinary blower. The second part acts more or less horizontally across the mouth of the chimney, and regulates the up-draught from the fire into the chimney. The parts are connected by hinges, or other means, to one another, and the second part can be raised or lowered by a rod bar or other method passing through the first part and workable from in front of it.

6,466.—SASH PULLEVS: *H. Holcroyt and Another.*—This invention refers to sash pulleys and other appliances in which pulleys on wheels are mounted in a similar or analogous manner to turn within boxings or frames, and more especially to pulleys having balls or rollers interposed between their bearing surfaces. As applied in the case of a sash pulley having a grooved wheel formed in one piece with, or fixed to, the axle, the inventor forms a pair of circular caps having their edges turning inwards to act as bearings for the pulleys or rollers. These caps, together with the balls or rollers, are placed over the ends of the axle. The grooved wheel, together with its axle and with the caps and balls or rollers around the ends of the axle, is placed within a suitable mould, and the boxing or frame is cast around the grooved wheel and caps in such manner as to rigidly hold or form substantially one piece of metal with the caps.

6,468.—BRICKS: *S. Jefferies.*—This specification describes an improvement in the making of bricks and similar articles from plastic clay, and relates to that class of machinery in which bricks are made by severing them with wire from a stream of plastic clay issuing from a die. There is attached to the framing of the cutting table, or carriage, a frame composed of hinged parallel links, which, when operated upon by a hand lever or other

COMPETITION, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITION.

Nature of Work.	By whom Advertised.	Premiums.	Designs to be delivered.
*Technical School	Harris Inst. Preston..	.....	June 24

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Ten Terrace Houses, Chapel Allerton, Leeds	.....	Smith & Tweedall	Mar. 27
Hotel and Boarding-house, The Lizard, Cornwall	.....	A. H. Jenkin	Mar. 28
Engine and Boiler House	Salisbury U.S.A.	J. C. Bothams	do.
Timber Piling (100 yds.)	Burnley Town Council	F. S. Button.....	do.
Brick and Pipe Sewers (5,200 yds.)	Gateshead Town Coun.	J. Bower.....	do.
Chimney Shaft, Canton (150 ft.)	Cardiff Corporation ..	W. Harpur	do.
*Granite Kerbing, Artificial Stone, &c.	Hove Commissioners..	*Official*	do.
*Sea Wall and Esplanade	do.	do.	do.
Three Sets of Purifiers, &c. Dawsholme	Glasgow Gas Com.	do.	do.
Flags, Kerbs, Setts, &c.	Cleckheaton Local Bd.	do.	do.
Sewering, Grosvenor-road East	St. Alban's Corp.....	do.	do.
Flags (3,000 yds. super.), Edgings (2,000 yds. lin.), Setts (70 tons), &c.	Runcorn Impt. Com...	do.	do.
Sea Wall	Portbury Sea-wall Com.	do.	Mar. 29
Re-roofing Church, Neath, Wales	The Churchwardens ..	.....	do.
Making-up, Tar-paving, &c. Raby-place	Fulham Vestry	W. Sykes	do.
Two Houses and a Villa, Hooley Hill, Ashton-under-Lyne	R. Appleby	T. George & Son	do.
Workshops, Stables, &c. Wortley	Leeds Corporation	R. Smith	do.
Cast-iron Water Pipes (2,400 ft.) Fencing, &c.	Budleigh Salterton Local Board	T. Parker	do.
Laying Water Mains (1,200 yds.)	Hastings R.S.A.	Jeffery & Skinner	do.
Setts, Kerbs, Flags, &c. Facit, Lancs.	Whitworth Local Board	W. Rodley.....	do.
Alterations and Additions to Business Premises, Cork	T. J. Lipton	R. Walker.....	Mar. 30
Restoring Linoleum Factory, Northallerton	.....	H. Walker.....	do.
Two Dwelling-houses and various Steadings, Freefield, Aberdeen	J. Riach.....	.....	do.
Harness Room and Outbuildings	Bradford Corporation	J. H. Cox	do.
Alterations, &c. to Parish Church, Randwick, Glos.	.....	Waller & Son	do.
Pulling-down and Re-building Schools....	Camborne School Bd.	J. Hicks.....	do.
Clock Turret at Town Hall	South Molton Twn C.	A. Thorne	do.
Dwelling-house, Great Corby	J. Millburn	.....	do.
Public Convenience, Old Gravel-lane	Vestry of St. George-in-the-East	*Official*	do.
Twenty Dwelling-houses, Ynsmeurig Estate	Aberdare Working Men's Building Society	C. H. Eelford	Mar. 31
Thirteen Cottages, Thurnscoe, Yorks	Whitworth, Son, & Nephew	H. L. Tacon	do.
Additions, &c. to Corn Exchange, Peterborough	.....	H. M. Townsend.....	do.
Ragstone, Kerbs, Setts, &c.	Smethwick Local Bd.	J. C. Stuart	do.
Alterations, &c. to Workhouse	Birmingham Union ..	H. Ward.....	do.
Three Shops, Navigation, Wales	.....	A. O. Evans	do.
Four Small Dwelling-houses, &c. Barnet..	Mr. Byfield	....	do.
Timber Store, Three Through Houses and Outbuildings, Midgley, Halifax	.....	T. L. Patchett	April 1
Additions, &c. to Chapel, Thorne, Yorks..	Trustees of the Methodist New Connexion	.....	do.
School Buildings, St. Gwinear, Cornwall	.....	R. S. Hutton	do.
Road Metal for Eight Parishes, Glasgow..	.....	W. Paul	do.
Master's Residence, &c. Blaenavon	Trevethin School Bd.	E. A. Lansdowne	do.
Converting Four Houses into Two Shops, Jacktrees, Cleator Moor	M. W. Coulthard	.....	do.
Formation, Flagging, &c. of one Street....	Normanton Local Bd.	*Official*	do.
Flint Road Metal, &c.	Horsham Highway Bd.	do.	April 3
Additions to School Buildings, Sowerby (Yorks)	Managers of St. Oswald National Schools....	T. Stokes	do.
Setts, Kerbs, Road Metal, &c.	Withington L.B.	A. H. Mountain	do.
Ornamental Iron Fencing, Gates, &c.	Festiniog Local Board	H. P. Maybury	do.
Outbuildings, Stables, &c.	Withington L.B.	A. H. Mountain	do.
School Buildings (1,064 seats), Wishaw, N.B.	Cambusnethan Sch. B.	R. A. Bryden	do.
Retort House, Coal Store, &c. at Gasworks	Newbury Gas Committee	R. M. Couper	do.
Alterations, &c. to Town Hall	Llandovery Twn Coun.	D. Phillips	do.
School Buildings, Rhosddu, nr. Wrexham	Stansty School Board	Luch & Gant	April 4
Additions, &c. to various Farms, &c.		J. S. Ullathorne	do.
Forming, Metalling, Kerbing, Channelling, &c. seven streets, Ellesmere Port	Wirral R.S.A.	Beloe & Priest	do.
*Oil Engine	Sevenoaks Union	S. F. Baker & Son	do.
Taking Down Old Shops and Erecting New	Hadfield Equitable Co-operative Society Ltd	.....	do.
Iron Girders, &c. for Public Abattoirs	Pontypridd Local Bd.	E. Rees	April 5

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Construction of Sewer	King's Lynn Corp.....	E. J. Silcock	April 5
Oak Park Fencing (800 yards)	Gt Yarmouth Twn C.	J. W. Cockrill	do.
Lock Gates	Swansea Har. Trust.	A. J. Schinck	do.
Mortuary Buildings, &c. Liverpool	Toxteth Park Local B.	J. Price	do.
Farm Buildings, Ruan Major, Cornwall ..	.....	G. Gow	do.
*Construction of Drain, &c.	Kensington Burial Bd	E. Monson, Jun.....	do.
*Removal of Sweeping, Street Watering, &c.	Chiswick Local Board	A. Ramsden	do.
Rag and Block Stone, Rochester	Kent Commissioners of Sewers	*Official*	do.
Supplying and Laying 4-in. Water Main, &c.	Queenborough Twn C.	do.	do.
Iron Roof, Girders, &c.	Salford Corporation ..	do.	April 6
Extensive Manufacturing Premises	Marton, Son, & Hall..	H. Williams	do.
Additions, &c. to Literary Institution....	Altrincham Local Bd	F. Popplewell	do.
Alterations and Additions to Two Schools	Tipton School Board	A. Long	do.
*Painting and Repairs at Western Hospital	Met. Asylums Board..	A. & C. Harston	do.
Setts, Flags, Kerbs, Macadam, &c.	Norden (Lancs) L.B.	J. W. Sunderland	April 7
*Offices, Stabling, &c. Palmer's Green	Southgate Local Board	C. G. Lawson	do.
Extensions and Alterations, Fishponds, Bristol	Diocesan Training College Committee ..	W. L. Bernard	do.
Cottage Hospital (Iron and Wood)	Wanstead Local Board	J. T. Bressy	do.
Road Metal (1,500 tons)	Ramsay District L.B.	*Official*	do.
Road Works (2,400 yds.), Sewers, &c. (1,600 yds.), Seaford, Sussex	Sutton Park Estate ..	J. A. Wallis	April 8
Subscription Rooms, &c. Stonehouse, Gloucestershire	.....	J. P. Moore	do.
*Erection of Public Library	Poplar Public Library and Museum Com...	Messrs. Clarkson	April 10
Precipitating Tanks, Smallbridge, Rochdale	Wuerdle and Wardle Local Board	J. T. Wood	do.
Baltic Red-Wood Sleepers (40,000)	Waterford and Limerick Railway Co. ..	J. Tighe	do.
Technical School, &c.	Hastings School Board	Elworthy & Son	do.
*Repairs, Painting, and other Works.....	Central London Sick Asylum	*Official*	do.
*York Paving	Bermondsey Vestry ..	do.	do.
*Wood Paving	St. George's, Hanover-square Vestry	do.	do.
*Making-up Private Streets	Richmond (Surrey) Town Council	E. J. Lovegrove	do.
*Sewers Work	Battersea Vestry	J. T. Pilditch	April 11
*Six Almshouses	William Smallwood Trust, Alcester	E. H. Lingen Barker..	April 12
*Making-up Roads, &c.	Windsor R.S.A.	W. Menzies	April 15
*Paving Work	Acton Local Board....	D. J. Ebbetts	April 18
Two Cottages, King's Lynn	Trustees of Castle Rising Estate	.....	April 20
*Public Baths	Walsall Corporation ..	H. T. Bonner	April 22
Residence, Ilkley	.....	Isitt & Adkins.....	No date
School Buildings, Blandford	Right Hon. Viscount Portman	C. Hunt	do.
Warehouse and Workshop, New Swindon	.....	Bishop & Pritchett....	do.
Re-building Hide and Skin Sheds, Newcastle-on-Tyne	Wilson & Waggott	A. Stockwell.....	do
Main Sewer, Stairfoot, Yorks	Ardsley Local Board ..	T. Haper.....	do.
Sewering, Paving, &c. New Street, Leicester	F. C. Parry	C. Ogden.....	do.
*Timber Work, Gt. Marlow Bridge	Bucks County Council	*Official*	do.
Dwelling-house	Sheffield Co-op. Soc. ..	.....	do.
Eight Houses, Kirstall, Leeds	J. Carlton	.....	do.
Circus Buildings, &c. Bolton	Frank Matcham	.....	do.
Six Cottages, Pemberton, Wigan	J. Martlew.....	.....	do.
Club Buildings, Rochdale	Castleton Moor Conservative Club.....	.....	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in.
*Clerk of Works	Manchester Corp	5*l.* 5*s.*	Mar. 28
*Road Surveyor	Hackney Bd. of Wks.	2*l.* 10*s.* weekly	do.
*Road Foreman	City of Birmingham ..	2*l.*	Mar. 29
Road Surveyor	Elgin County Council	200*l.* per annum, &c...	do.
Clerk of Works	Barry and Cadoxton Local Board	2*l.* per week	do.
Clerk of Works	Rothwell Local Board	2*l.* 10*s.* per week.....	Mar. 30
Surveyor	Warminster Loc. Bd.	.....	April 1
*Manual Trainer	Central London School District	2*l.*	do.
*Shop Foreman of Joiners	LondonCountyCouncil	3*l.* 10*s.* per week	April 8
*Surveyor, Inspector of Nuisances, &c.	Haverhill Local Board	150*l.*	April 11

Those marked with an Asterisk (*) are advertised in this number. *Competition, p.* iv. *Contracts, pp.* iv., vi., *and* viii. *Public Appointments, pp.* xviii.

mechanism, set in motion by the attendant, comes forward beneath the board carrying the bricks, and lifts or slides it with its load on to a truck or other contrivance prepared to receive it. To assist the lifting frame in clearing the board on its return, the front bricks are jointed so as to give way and lower the front edge of the supporting bars or table. To keep the bottom of the advancing stream of clay oiled, it is proposed to arrange a small roller, rotating on a vertical axle, in contact with the side of the stream of clay, against which it is constantly pressed by a spring, the roller being connected with an oil tank.

6,554.—DOORS: *J. Rhodes.*—This invention relates to improvements in apparatus for closing doors, and checks to be employed in connexion therewith, to prevent slamming, &c. The invention can only be understood by referring to the detailed drawings and specification.

NEW APPLICATIONS FOR LETTERS PATENT.

March 6.—4,788, H. McClellan, Flushing Water-closets, &c.—4,790, D. Jones & G. Davis, Fastenings for Lifting or Lowering Marble, Granite, &c.—4,797, C. Rice, Portable Door-stop for Preventing Doors being shut.—4,810, J. Jones, Presses for Bricks, Tiles, &c.—4,825, E. Nelson, Damp Course Materials for Foundations of Buildings.—4,856.—W. Mortimer, Bolts.

March 7.—4,916, P. Jensen, Building Walls, Pillars, &c. of Iron Frameworks and Concrete.—4,919, W. Kinnerney, Combined Screw and Nail.—4,921, C. Leni, Automatically Disinfecting Water-closets, &c.—4,948, A. Pollard, Alarm Bells for Doors, &c.—4,955, St. Budden, Window-sash Fasteners.—4,973, F. Le Rossignol, Grease Traps.—4,987, H. Sheridan, Metallic Paving for Roadways, Footpaths, &c.

March 8.—5,012, E. Crickmay, Combined Garden Edging and Water Channel.—5,032, G. Gibson, Sashhock for Windows.—5,053.—J. Anderson, General Joinery Machines.—5,069, L. Waghorn, Flushing Cisterns.

March 9.—5,086, D. Martyn, Automatic Brick Cutting able and Counter.—5,108, C. Elliott, Metallic Roofing.—5,113, W. Henshall, Dovetailing Cutter and Slotting Tool.—5,121, W. Eatwell, Smoke-cowl or Ventilator.—5,136, J. Hahmann, Stove.—5,165, G. Hardingham, Syphon Automatic Flushing Apparatus.

March 10.—5,193, E. Smith, Cutting Tools.—5,206, T. Taylor, Screws and in Screw-drivers, Brace-bits, or Keys for use with same.—5,240, C. Hass, Reproducing Facsimile Carvings in Wood and Other Material.—5,250, A. Gibbs, Brick.—5,259, N. Parascho and E. Thorpe, Glazing Staple.

March 11.—5,268, W. Pates, Trap Shields for Water-closet Traps.—5,281, T. Paxton, Attaching Door-knobs, &c., to their Spindles.—5,306, Z. Baugh, Baker's Ovens.—5,308, C. Jones, Wood Screws.—5,331, A. Henderson, Cutting or Sawing Stone, &c.

PROVISIONAL SPECIFICATIONS ACCEPTED.

522, G. Robertson, Heating and Cooking Stoves.—1,162, M. Syer, Improved connection for Water-closet Traps, and Pipes.—1,184, W. Coke, Self-acting Wedge for Window-sashes, with which may be combined a self-acting sash-fastener.—1,907, J. Hancock, senior, Cisterns for Water-closets.—2,688, J. Anton van Nes, Preventing the Freezing of Windows.—3,106, W. Webster, Cements.—3,116, J. Walton, White Lead.—3,508, J. Clayton, Sash-fasteners.—4,013, L. and J. Chandler, Cap or Cowl for preventing down draught in chimneys.—4,401, F. Persse, Draught Preventer for Doors, Windows, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

(Open to Opposition for Two Months.)

5,493, E. Carter, Automatic Water-closet and Disinfector.—6,408, W. Waghorne, Chimney Cowls.—7,248, H. and H. J. Warrington, Bricks for Building Purposes.—7,270, R. Huppertsberg, Artificial Bituminous Stone.—8,865, V. Lewes, Manufacture of Glass.—19,502, C. Horton, Water-closets.—20,801, R. Matthews and J. Noad, White Lead and Coloured Pigiments.—501, W. Thompson, Building Walls, and in Street Metal Coverings therefor.

SOME RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

MARCH 7.—By *W. Bradly:* 12, Railway-ter., Lewisham, f., 155*l.*

MARCH 13.—By *B. Brown:* 6 and 7, Hutchinson's-av., Aldgate, f., r. 72*l.* 16*s.*, 850*l.*; 198 and 200, Burdett-rd., Mile End, u.t. 74 yrs., g.r. 6*l.*, 600*l.*; 114, Chalgrove-rd., Hackney, u.t. 81 yrs., g.r. 2*l.*, 200*l.*

MARCH 14.—By *Rogers, Chapman, & Thomas:* 74, Warwick-st., Pimlico u.t. 34 yrs., no g.r., 665*l.*—By *Glaiser & Sons:* 120, 122, 126, 128, and 130, Upper Richmond-rd., Putney, f., r. 260*l.*, 4,720*l.*; 110, 112, 114, and 116, Upper Richmond-rd., f., 4,820*l.*—By *Foster & Crasfield:* A profit rental of 10*l.*, u.t. 9 yrs., 7, Dorrell-pl., Brixton, 50*l.*

MARCH 15.—By *Hobson, Richards, & Co.:* 100, Southwark-st., Blackfriars, f., r. 150*l.*, 1,510*l.*; 29, St. John's-villas, Holloway, u.t. 58 yrs., g.r. 7*l.*, r. 40*l.*, 300*l.*—By *C. & H. White:* F.g.r. of 10*l.*, Greenwich-rd., Deptford, reversion in 26 yrs., 280*l.*; 65, Queen-rd., Peckham, u.t. 56 yrs., g.r. 7*l.* 10*s.*, r. 50*l.*, 630*l.*; 6, Strutton-ground, Westminster, u.t. 7 yrs., g.r. 15*s.*, r. 55*l.*, 225*l.*—By *Ellis, Morris, & Co.:* 202, Goldhawk-rd., Shepherd's Bush, u.t. 83 yrs., g.r. 5*l.*, r. 40*l.*, 380*l.*; 23, Broughton-rd., Ealing, u.t. 80 yrs., g.r. 5*l.* 10*s.*, r. 30*l.*, 295*l.*; 36, 37 and 38, Avelon-rd., Fulham, u.t. 66 yrs., g.r. 12*l.*, 410*l.*; 37 and 39, Dorset-rd., Kennington, u.t. 29 yrs., g.r. 8*l.* 5*s.*, 420*l.*

MARCH 16.—By *C. P. Whiteley:* 11, Markham-sq., Chelsea, u.t. 34 yrs., g.r. 9*l.* 9*s.*, 495*l.*—By *Newbon & Co.:* 267, Liverpool-rd., Islington, f., 510*l.*; 75, Tollington-rd., Holloway, u.t. 45 yrs., g.r. 6*l.* 6*s.*, r., 38*l.*, 325*l.*; 79, Euston-st., Euston-sq., u.t. 26 yrs., g.r. 10*l.* 10*s.*, 120*l.*; 5, Frederick-st., Caledonian-rd., u.t. 58 yrs., g.r. 3*l.* 10*s.*, 225*l.*; 68, Isledon-rd., Finsbury-pk., u.t. 66 yrs., g.r. 9*l.*, r. 40*l.*, 325*l.*; 82, Isledon-rd., u.t. 66 yrs., g.r. 7*l.*, r. 36*l.*, 315*l.*—By *Stimson & Sons:* 127 & 129, Copenhagen-st., Islington, u.t. 49 yrs., g.r. 1*l.* 3*s.* 4*d.*, r. 85*l.*, 950*l.*; 49 & 51, Stanworth-st., Bermondsey, u.t. 22 yrs., g.r. 3*l.* 6*s.* 8*d.*,

180*l.*; 21, 23, & 25, Earl-rd., u.t. 27 yrs., g.r. 9*l.* 5s., 440*l.*; 129, Fort-rd., u.t. 46 yrs., g.r. 4*l.* 10s., 320*l.*; 146 & 148, Fort-rd., u.t. 48 yrs., g.r. 9*l.*, 560*l.*; 39, 41, & 43, Esmeralda-rd., u.t. 45 yrs., g.r. 15*l.*, 700*l.*; 46, Esmeralda-rd., u.t. 47 yrs., g.r. 5*l.*, 250*l.*; 70, 132 to 142 even, Raymouth-rd., u.t. 60 yrs., g.r. 17*l.* 6s. 8d., 2,015; 43, Lyndhurst-rd., Peckham, f., r. 41*l.*, 600*l.*—By *H. J. Bliss & Sons:* 7 and 11, Victoria-rd., Forest Gate, f., r. 65*l.*, 845*l.*; 37, Palmerston-rd., f., 280*l.*; 286, Romford-rd., Ilford, u.t. 912 yrs., g.r. 2*l.* 2s., r. 30*l.*, 475*l.*; 3 and 4, Forest Villas, Manor-pk., f., r. 64*l.*, 865*l.*: 103, Devon's-rd., Bromley-by-Bow, f., r. 45*l.*, 465*l.*; 34, Tudor-rd., Hackney, u.t 30 yrs., g.r. 12s., 290*l.*; 33, 34, and 35, Dunston-rd., f., 420*l.*; 7, 8, and 9, Victoria Grove, u.t. 33 yrs., g.r. 9*l.* 9s., 360*l.*; 461 and 463, Bethnal Green-rd., Bethnal Green, f., r. 70*l.*, 1,200*l.*; 19 to 23, Pott-st.; 1 to 5 and 7 to 11, Lucas-st.; 1½ and 2A, Pitt-st., u.t. 6 yrs., g.r. 87*l.* 10s., 440*l.*; 14 to 22 even, Chilton-st., f., 1,370*l.*; 12 and 14, Granby-st., f., 650*l.*—By *Weston & Son:* 168 to 176 (even), Clapham-pk.-rd., Clapham, f., r. 218*l.*, 2,680*l.*; 37 to 43 (odd), Lyham-rd., f., r. 120*l.*, 1,470*l.*; 47, 49, and 55, Lyham-rd., f.,r. 96*l.*, 1,195*l.*; 18 and 20, Haycroft-rd., Brixton, u.t. 80 yrs., g.r. 14*l.*, r. 68*l.*, 590*l.*; Nos. 117 to 123 (odd); 131, 133, 137, and 139, Acre-lane; and l.g.r. of 38*l.* 5s., u.t. 42 yrs., g.r. 150*l.*, with short Reversion, 2,300*l.*; 159, Acre-lane, and l.g.r. of 58*l.* 15s., u.t. 42 yrs., g.r. 12*l.*, with short Reversion, 250*l.*

MARCH 17.—By *W. Houghton:* "Ottawa House," Oxford-rd., Walthamstow, f., r. 60*l.*, 590*l.*; three plots of f. land, Vestry-rd., 395*l.*; 43 and 45, Hill Side-rd., Stamford Hill, u.t. 89 yrs., g.r. 12*l.* 18s., 445*l.*—By *W. W. Jenkinson:* 50, Upper Bedford-pl., Russell-sq., and stabling, u.t. 16 yrs., g.r. 23*l.* 15s., r. 145*l.*, 700*l.*; 55, 57, and 59, Maryon-rd., Charlton, u.t. 25 yrs., g.r. 22*l.* 10s., r. 100*l.*, 300*l.*—By *A. A. Murrell:* 42, Broadway, Ealing, f., r. 340*l.* 10s., 4,700*l.*—By *Baker & Sons:* 39, Kildoran-rd., Brixton, u.t. 91 yrs., g.r. 6*l.* 10s., r. 29*l.*, 225*l.*; 45 to 51 (odd), Landcroft-rd., Dulwich, u.t. 86 yrs., g.r. 22*l.*, 680*l.*; 351 and 353, Upland-rd., u.t. 86 yrs., g.r. 14*l.* 14s., 200*l.*; 53, 55, 72, and 74, Rodwell-rd., u.t. 86 yrs., g.r. 20*l.* 10s., 660*l.*; 19, Arlingford-rd., Tulse Hill, u.t. 82 yrs., gr. 6*l.* 10s., 165*l.*; 2 and 4, Alt-grove, Wimbledon, u.t. 75 yrs., g.r. 14*l.*, 360*l.*; 227, Haydon-rd., u.t. 88 yrs., g.r. 7*l.* 10s., 110*l.*; Nos. 114, 116, 118 and 120, Clapham-pk.-rd., u.t. 12 yrs., g.r. 23*l.*, r. 186*l.*, 520*l.*; 30, Bassingham-rd., Earlsfield, u.t. 96 yrs., g.r. 7*l.*, 160*l.*; 47 to 57 (odd), East Dulwich-grove, Dulwich, f., r. 168*l.*, 2,250*l.*; 29 and 31, Crystal Palace-rd., f., r. 72*l.*, 700*l.*; 1, King Edward-rd., Waltham Cross, f., r. 20*l.*, 210*l.*; 70 to 90, Holmesdale-rd., Bromley, u.t. 87 yrs., g.r. 52*l.*, 1,065*l.*; 75, Huddleston-rd., Willesden, f., r. 30*l.*, 295*l.*; 37 and 39, Birdhurst-rd., Croydon, u.t. 87 yrs., g.r. 23*l.*, r. 77*l.*, 500*l.*; 39, 41, 46, 48, 127 to 133 (odd), Selkirk-rd., Tooting, u.t. 85 yrs., g.r. 42*l.*, 940*l.*; 121 to 127 (odd), Graveney-rd., u.t. 85 yrs., g.r. 16*l.*, 385*l.*; profit rental of 45*l.*, Westow Hill, Norwood, u.t. 13 yrs., 350*l.*; 1 to 21 (odd), Blythe Hill, Catford, f., 3,040*l.*; 7 to 12, Haseltine-rd., Sydenham, u.t. 67 yrs., g.r. 30*l.*, 495*l.*; 1, 2, and 3, Bishop's-rd., Hanwell, f., 265*l.*; 1, Queen-st., Deal, Kent, f., r. 37*l.*, 400*l.*; 121, Telford-rd., Hendon, u.t. 89 yrs., g.r. 6*l.*, 100*l.*; 20, New-st., Covent Garden, l., and "Fairview," Trinity-rd., Wimbledon, sold before auction.

[*Contractions used in these Lists.*—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent yd. for yard, &c.]

PRICES CURRENT OF MATERIALS.

TIMBER.		
Greenheart, B.G.	ton	9/0/0 0/0/0
Teak, E.I.	load	9/0/0 15/0/0
Sequoia, U.S.ft.cu.		2/3 2/6
Ash, Canada	load	2/10/0 4/0/0
Birch, do.		3/5/0 4/10/0
Elm, do.		3/10/0 4/10/0
Fir, Dantsic, &c.		1/10/0 3/5/0
Oak, do.		3/0/0 5/5/0
Canada		5/10/0 7/0/0
Pine, Canada red		2/10/0 3/10/0
Do. Yellow		2/10/0 4/10/0
Lath, Dntsic, fath		5/0/0 6/0/0
St. Petersburg		5/0/0 7/0/0
Deals, Finland		
2nd & 1st std	100	7/0/0 9/10/0
Do. 4th & 3rd		6/10/0 7/0/0
Do. Riga		6/10/0 8/0/0
St. Petersburg, 1st yellow		10/0/0 14/0/0
Do. 2nd yellow		8/0/0 9/0/0
Do. white		7/10/0 9/10/0
Swedish		7/0/0 15/10/0
White Sea		8/0/0 16/10/0
Canada, Pine 1st		21/0/0 27/10/0
Do. do. 2nd		15/0/0 17/0/0
Do. do. 3rd &c.		7/10/0 10/0/0
Do. Spruce, 1st		8/10/0 11/0/0
Do. do. 3rd & 2nd		6/15/0 8/0/0
New Brunswick		6/10/0 7/10/0
Battens, all kinds		3/0/0 15/0/0
Flooring boards, sq., 1 in. prep. 1st		0/8/6 0/14/6
Do. 2nd		0/7/6 0/10/6
Other qualities		0/4/0 0/7/6
Cedar, Cuba	ft.	¼ ¼
Honduras, &c		⅓ ¼
Mahogany, Cuba		¼ ⅝
St. Domingo, cargo av.		¼ 1/6
Mexican do. do.		⅓ ¼
Tobasco do. do.		⅓ ⅝
Honduras do.		¼ ⅜
Box, Turkey	ton	4/0/0 13/0/0
Rose, Rio		9/0/0 20/0/0
Bahia		8/0/0 18/0/0
Satin, St. Domingo	ft.	0/0/6 0/1/3
Porto Rico		0/0/7 0/1/6

TIMBER (*continued*).		
Walnut, Italian		0/0/3½ 0/0/7
METALS.		
Iron—Pig, in Scotland	ton	2/0/9 0/0/0
Bar, Welsh, in London		5/17/5 6/0/0
Do. do. at works in Wales		5/7/6 5/10/0
Do. Staffordshire, in London		6/0/0 6/10/0
COPPER—British, cake and ingot		48/0/0 48/10/0
Best selected		49/5/0 49/15/0
Sheets, strong		57/0/0 58/0/0
Chili, bars		45/6/3 45/13/9
YELLOW METAL	lb	0/4 15-16 0/5⅛
LEAD—Pig, Spanish	ton	9/13/9 9/15/0
English com. brands		9/16/3 9/18/9
Sheet, English, 6 lbs. per sq. ft. and upwards		11/10/0 0/0/0
Pipe		12/0/0 0/0/0
ZINC—English sheet	ton	21/10/0 0/0/0
Vieille Montagne		22/0/0 0/0/0
TIN—Straits		95/5/0 95/15/0
Australian		95/15/0 96/5/0
English Ingots		98/0/0 98/10/0
Banca		94/10/0 95/0/0
Billiton		94/10/0 95/0/0
OILS.		
Linseed	ton	20/15/0 21/0/0
Cocoanut, Cochin		30/0/0 0/0/0
Do. Ceylon		27/10/0 0/0/0
Palm, Lagos		33/0/0 0/0/0
Rapeseed, English pale		26/5/0 26/10/0
Do. brown		24/15/0 25/0/0
Cottonseed ref.		24/0/0 0/0/0
Oleine		23/0/0 24/0/0
Lubricating, U.S.		4/0/0 5/0/0
Do. refined		5/10/0 12/0/0
TAR—Stockholm	barrel	0/18/6 0/0/0
Archangel		0/12/6 0/0/0

TENDERS.

*** **Next week** communications for insertion under this heading must reach us *not later than* 10 *a.m. on Wednesday*, as we go to press a day earlier than usual.

BERWICK-UPON-TWEED.—For the construction of a cement concrete sea-wall, Spital, for the Urban Sanitary Authority. Mr. Dickinson, Borough Surveyor, Urban Sanitary Authority Buildings, Berwick-upon-Tweed:—

John Ward	£3,739	2	2
Samuel Craig	2,699	16	4
R. C. Brebner	2,323	14	11
Soldien Hipwell	1,908	7	6
William Kidd	1,891	3	9
John Carricel	1,746	9	4
John Cockburn & Son	1,682	0	0
W. S. Kearton	£1,456	8	8
John Baird & Son	1,450	0	0
Robert Rule	1,260	0	0
A. G. Brunton	1,232	17	11
Peter Rule, Tweedmouth*	1,180	0	0

*Accepted)

CAMBRIDGE.—For alteration and additions to the buildings of the University Press, Cambridge, for the Syndicate of the University Press. Mr. Henry Dawson, architect, 46, Finsbury-pavement. Quantities by Messrs. D. Campbell & Son, 69, Finsbury-pavement, E.C.:—

Maides & Harper	£6,997	0	
Colls & Son	6,800	0	
Ashby & Horner	6,745	0	
Bell & Son	6,510	0	
Parnell & Sons	6,300	0	
W. Tindall, Cambridge*	6,183	13	

*Accepted.

CARDIFF.—Accepted for the erection of a mission chapel, Adamsdown-square, Cardiff:—
Cox and Bardo £716

CARDIFF.—For widening and improving Beggar's Well-road, Barry, for the Local Board of Barry and Cadoxton. Mr. J. C. Pardoe, Surveyor, Vere-street, Cadoxton, near Cardiff:—

D. & G. Love	£3,805	4	0
Baker & Gregory	3,765	10	10
Richards & Cranston	3,560	2	11
Thomas Rees	3,253	2	2
T. Jones Davies	3,093	3	4
John Mackay	£2,788	0	0
George Rutter	2,668	8	5
Thomas Paulett	2,522	12	6
E. J. Ince, Cadoxton (accepted)	2,488	17	9

CHELL (Staffordshire).—For the erection of St. Michael's Mission Church. Messrs. Ralph Dain & Son, architects, Liverpool-road, Burslem:—

Yorke & Goodwin	£1,750		
T. Godwin	1,750		
C. Cope	1,748		
F. W. Jackson	£1,673		
W. Cooke	1,660		
J. J. Longden, Burslem*	1,649		

*Accepted.

CLACTON-ON-SEA.—For drainage, certain outfall works, and 2,130 yards of tunnels or headings at Clacton-on-Sea, Essex, for the Clacton-on-Sea Local Board. Mr. W. H. Radford, engineer, Nottingham:—

H. Vickers	£19,450		
J. F. Price	16,922		
J. D. Townsend	14,400		
Joseph Meston	13,279		
Joseph Jackson	12,990		
J. Bentley	12,300		
G. Bell	£12,290		
J. Band	12,200		
Rackham & Bentham	11,864		
W. G. Gillingham	11,320		
B. Cook & Co., Battersea*	10,374		

*Accepted.
[Egineer's estimate, £8,830].

CROYDON.—For the repair of Campden and Spencer roads, and Luna-road, for the Town Council. Mr. W. Powell, Borough Surveyor, 8, Katharine-street, Croydon:—

Spencer-road.

H. Lake	£676	16	8
W. H. Wheeler	673	10	2
A. Bullock, Croydon*	£643	12	7

*Accepted.

Campden-road.

H. Lake	£998	4	8
W. H. Wheeler	947	19	10
A. Bullock, Croydon*	£947	13	11

*Accepted.

Luna-road.

A. Bullock	£336	13	11
H. Lake, Croydon*	£334	9	5

*Accepted.

DEWSBURY.—Accepted for the erection of eleven houses, shop, rooms, &c., Malkrond-lane, for the Dewsbury Pioneers' Industrial Society, Limited. Messrs. Holtom & Fox, architects, Westgate, Dewsbury. Quantities by the architects:—

Mason.—Geo. Whitehead, Westborough, Dewsbury	£1,820	0	0
Joiners.—Lyles & Smith, Batley Carr, Dewsbury	601	10	0
Plumber.—Frank Newsome, Northgate, Dewsbury	210	0	0
Plasterer.—Wm. Parker, Heckmondwike	110	0	0
Slater.—Geo. Hargreaves, Eastborough, Dewsbury	87	0	0
Painter.—C. A. Kershaw, Batley Carr, Dewsbury	42	0	0
Total	£2,870	10	0

ENFIELD.—Accepted for completing two houses, Dryden-road, Bush-hill Park. Messrs. Crickmay & Sons, architects, 17, Parliament-street, S.W.:—
Percival Hart, Station Works, West Green £920 0 0

FEATHERSTONE (Yorks).—Accepted for the erection of four houses and shops, Station-lane, Featherstone, for Mr. James Maxwell. Mr. W. H. Fearnley, architect, Station-lane, Featherstone, Yorks. Quantities by architect:—

Bricklayer.—A. Fairbairn, Snaith	£464	19	10
Mason.—A. Fairbairn, Snaith	121	12	4
Joiner, &c.—G. B. Hilton, Pontefract	442	10	0
Plasterer.—J. B. Greenwood, Heckmondwike	63	0	0
Plumber.—A. Lucas, Ossett	76	10	0
Painter.—A. Lucas, Ossett	16	10	0
Slater.—J. Allison, Castleford	65	10	0
Total	£1,250	12	2

HANLEY (Staffs).—For the erection of buildings in connexion with the supply of electricity to the town, for the Corporation. Mr. Joseph Lobley, Borough Engineer, Hanley:—

Holden & Myles	£3,225		
N. Bennett	3,189		
A. Ward	3,085		
T. Godwin	£2,999		
C. Cornes, Hanley*	2,990		
J. T. Clark (withdrawn)	2,775		

*Accepted.

HARROW.—For new roads, sewers, surface water drains, &c., for the British Land Company, Limited, on their estate at Harrow, Middlesex. Mr. Henry B. Michell, surveyor:—

Killingback	£2,170	0	
Peill & Son	1,947	10	
Drury	1,920	0	
Pizzey	1,870	0	
Rogers	£1,869	0	
Wilson	1,839	0	
Jackson	1,818	0	
Bloomfield	1,798	0	

LEAMINGTON.—For the extension of the river walk, including a tunnel, wall, footbridge, &c., for the Corporation. Mr. W. De Normanville, Engineer, Town Hall, Leamington:—

Contract No. 1.—Tunnel, Wall, and Bridge Abutments.

C. F. Caffin	£1,192	1	8
J. Legge	1,069	4	7
Jenkins & Son	1,018	7	0
Smith & Sons	£851	0	0
J. Bowen, Leamington (accepted)	826	0	0

Contract No. 2.—Ironwork for Bridge.

E. C. J. Keay	£452	6	9
Somervail & Co.	213	16	2
Phœnix Foundry	181	1	10
H. S. Maynard	179	14	9
J. Hill & Sons	163	14	6
J. Tildesley	£160	0	0
Jenkins & Son	154	17	6
Smith & Sons	152	0	0
E. Finch & Co.	150	8	9
A. J. Ellin	143	17	7

. Ormе Brettel, Low Moor Works, Worcester* £136 18 0

*Accepted.

LLANDILO.—For the erection of a parsonage house, Llanarthney. Mr. D. Jenkins, architect, Llandilo:—

D. C. Jones	£1,992		
A. Berridge	1,933		
J. D. Williams	1,745		
W. Evans	£1,700		
Thomas Brothers	1,681		

LLANDOVERY.—For the erection of a vicarage, Rhandirmwyn. Mr. D. Jenkins, architect, Llandilo:—

D. C. Jones	£2,377		
J. D. Williams	1,965		
Price & Deakins	£1,772		

LLANELLY.—For new school at Machynis, for the Llanelly School Board. Mr. J. B. Morgan, architect:—

Williams & Evans	£1,536		
J. Evans	1,577		
G. Mercer	£1,570		

LLANELLY.—For new schools at the Dock, for the Llanelly School Board. M. J. B. Morgan, architect:—

Thos. Watkins & Co.	£2,341	0	0
Williams & Evans	2,187	8	2
J. Evans	2,163	18	0
T. P. Jones	£2,011	0	0
G. Mercer	1,927	18	0

LONDON.—For decorations, &c., at the Baptist Chapel, Commercial-road, E. Mr. H. T. A. Chidgey, architect, 497, Commercial-road E.:—

Faulkner	£299	0	
George Parker	237	0	
Henessey	£162	0	
Calnan & Co.	156	3	

LONDON.—For the completion of the West Silvertown Schools, Victoria Docks, E., by the erection of boys' department for 240 children, and including tar-paving the entire playgrounds, for the West Ham School Board. Messrs. J. T. Newman & Jacques, architects, 2, Fen-court, London, E.C. Quantities by Messrs. R. L. Curtis & Sons:—

Catley	£4,448	0	
Gregar & Son	3,898	0	
Fulcher	3,833	0	
Hoskin	3,825	0	
Reed & Son	3,728	0	
Maddison	£3,713	0	
Sharpe	3,570	0	
Goodchild	3,299	10	
Hearle & Farrow*	3,195	0	

* Accepted subject to the approval of the Education Department.

LONDON.—For new pavilions, kitchens, laundry, &c., Whitechapel Union Workhouse, Bow. (Bills 1, 1a, 3, and 5.) Mr. Bruce J. Capell, architect:—

Downs	£24,626		
Harris & Wardrop	24,343		
Nightingale	24,336		
Chappell	24,223		
Johnson	24,115		
Perry	23,779		
Jerrard	£23,582		
Lawrance	23,516		
Munday	23,514		
Shurmur	23,468		
Pattinson	23,380		
W. Goodman	23,075		

LONDON.—For Sunday Schools, &c., at Christchurch Mission, Old Ford-road, Bow, E., for the Rev. M. Sweetnam and the Rev. H. A. S. Pitt. Messrs. Walter A. Hills & Son, architects, 149, Bow-road, E.:—

F. & F. J. Wood	£1,170		
Salt	1,099		
G. Limn & Sons	997		
Sheffield Bros.	£987		
J. & F. Bane, Stratford*	835		

* Accepted.

LONDON.—For the erection of a cookery centre in connexion with the Raywood-street School, Battersea, and for providing a coal shed, for the School Board for London. Mr. T. J. Bailey, Architect:—

B. E. Nightingale	£864	0	
J. Shillitoe & Sons	820	0	
James Smith & Sons	758	0	
J. Wilmott & Sons	739	0	
Treasure & Son	736	0	
F. J. Coxhead	703	0	
J. Marsland	695	0	
Hart Bros.	£689	0	
Holloway Bros.	671	0	
Lathey Bros.	668	0	
I. Tyerman	647	0	
Holliday & Greenwood, Brixton*	577	0	

*Recommended by the Works Committee for acceptance.

LONDON.—Accepted for restoring No. 11, Ivy-lane, Newgate-street, E.C., after fire:—
Hewitt, Chiswell-street £250 19 0
[No competition.]

LONDON.—For alterations and repairs at No. 15, Hatton-garden, for Mr. J. Chomette. Mr. A. H. Belcher, architect. Quantities supplied:—

Colls & Co.	£830	0	0
Hayward	792	0	0
H. & F. Fearman	£754	18	6
Greenwood	734	0	0

LONDON.—For the erection of a school on the site in Brockley-road, to provide accommodation for 800 children, and for the erection of a school-keeper's house, for the School Board for London. Mr. T. J. Bailey, Architect:—

Foster & Dicksee	£16,492		
J. & M. Patrick	15,186		
D. Charteris	14,563		
Stimpson & Co.	14,320		
Holloway Bros.	14,280		
S. & W. Pattinson	£14,156		
C. Cox	13,982		
E. Lawrance & Sons	13,509		
Kirk & Randall, Woolwich*	12,987		

* Recommended by the Works Committee for acceptance.

LONDON.—For the enlargement of the Johanna-street School, Lower Marsh, Lambeth, by 107 places, and for the erection of a new house for the school-keeper of the school, and for other works for the School Board for London. Mr. T. J. Bailey, Architect:—

Lathey Bros.	£13,651		
Hart Bros.	13,615		
B. E. Nightingale	13,412		
W. Downs	13,097		
J. Tyerman	12,934		
J. Marsland	£12,605		
S. & W. Pattinson	12,470		
D. Charteris	12,355		
Holliday & Greenwood, Brixton*	11,679		

* Recommended by the Works Committee for acceptance.

LONDON.—For removing two temporary iron buildings from the Faunce-street site, Kennington Park-road, and for re-erecting them in Darrell-road, East Dulwich, for the School Board for London. Mr. T. J. Bailey, Architect:—

T. Cruwys	£644	0	
D. Charteris	559	0	
Croggon & Co., Ltd.	422	10	
W. Harbrow, South Bermondsey Station*	£419	5	

* Recommended by the Works Committee for acceptance.

LONDON.—For the erection of a school on the site in Enfield-road to provide accommodation for 1,178 children, and a school-keeper's house, &c., for the School Board for London. Mr. T. J. Bailey, Architect:—

J. Longley & Co.	£19,376		
Hart Bros.	16,371		
Killby & Gayford	16,328		
D. Charteris	16,254		
G. S. S. Williams & Son	15,993		
Colls & Son	£15,532		
J. Grover	15,487		
C. Cox	15,483		
E. Lawrance & Sons, Wharf-road, N.*	15,049		

* Recommended by the Works Committee for acceptance.

LONDON.—For providing new stoneware troughs and automatic flushing tanks for the offices in connexion with the York-road School, King's-cross, for the School Board for London. Mr. T. J. Bailey, Architect:—

Kirby & Chase	£1,200		
Staines & Son	997		
C. Cox	996		
C. S. S. Williams & Son	927		
T. Taylor & Son	897		
Norris & Luke	£864		
A. Salter	828		
G. Ball	815		
E. Houghton & Sons, Stroud-green*	783		

* Recommended by the Works Committee for acceptance.

LONDON.—For enlarging the Gloucester-road School, Peckham, by 363 places, and for other works, for the School Board for London. Mr. T. J. Bailey, Architect:—

B. E. Nightingale	£12,858		
William Downs	12,793		
D. Charteris	12,398		
Holliday & Greenwood	11,949		
Holloway Bros.	11,905		
Hart Bros.	£11,744		
E. Lawrance & Sons	11,430		
S. & W. Pattinson	11,385		
J. & M. Patrick, Rochester*	10,272		

*Recommended by the Works' Committee for acceptance.

LONDON.—For the erection of a school to provide accommodation for 780 children on the Mulgrave-place site Wellington-street, Woolwich, and for the erection of a cookery centre, laundry centre, and school-keeper's house, for the School Board for London. Mr. T. J. Bailey, Architect:—

Hart Bros.	£16,012	0	0
William Downs	15,699	0	0
J. & M. Patrick	15,437	0	0
James Smith & Sons	15,201	0	0
Edward Proctor	£15,097	14	10
H. Lidstone	14,474	0	0
Kirk & Randall, Woolwich*	14,343	0	0

* Recommended by the Works Committee for acceptance.

LONDON.—For the rebuilding of the police-station at Geraldroad, for the Receiver for the Metropolitan Police District. Mr. John Butler, Architect. Quantities by Mr. W. H. Thurgood:—

Brass & Son	£6,945		
Higgs & Hill	6,798		
Lawrance & Son	6,520		
Perry & Co.	6,450		
Scrivener & Co.	6,396		
C. Ansell	6,357		
Smith & Sons	£6,345		
J. Chappell	6,340		
Garlick & Horton	6,333		
Grover & Son	6,300		
Lathey Bros.	6,200		
Hart Bros.	6,089		

LONDON.—For the erection of a Church of England Soldiers Institute in Wellington-street, Woolwich, for the Trustees of the Association. Messrs. Newman & Newman, architects, 31, Tooley-street, London Bridge. Quantities by Mr. W. T. Farthing, 46, Strand, W.C.:—

Leslie & Co.	£6,479		
Lascelles & Co.	6,415		
Hart Bros.	6,317		
W. Downs	5,921		
Todd	5,841		
Battley, Sons, & Holmes	5,681		
Goddard & Son	5,683		
Coleman	£5,490		
Godson & Sons	5,450		
Balaam Bros.	5,300		
Richardson	5,269		
Bullers	5,081		
Cowley & Drake	4,824		

LONDON.—For painting works to be executed at Ravensworth, West Hampstead. Mr. Walter Graves, architect:—

Green and Abbott	£137 10	Audrey	£109 10
Lear	131 0	E. Houghton & Son	93 0

MONMOUTH.—Accepted for paving and channelling, with granolithic paving, the cattle standings in the market, for the Monmouth Corporation. Mr. P. E. Wanklyn, F.S.I., Borough Surveyor, Monmouth:—

Imperial Stone Company, East Greenwich £442 0 0

NEWPORT (Mon.).—For taking down and rebuilding two shops and houses, Commercial-street; and taking down three cottages and rebuilding two shops and houses, Cross-street, for the trustees of the late John Clarke. Mr. E. A. Lansdowne, architect, National Bank of Wales-chambers, Commercial-street, Newport, Mon. Quantities by architect:—

D. C. Jones & Co.	£3,194	C. Locke	£2,645
T. G. Diamond	3,179	J. Linton	2,600
T. Webb	3,075	C. H. Reed	2,597
J. Jenkins	2,850	E. Richards	2,594
Hatherly & Carr	2,780	D. Parfitt	2,580
G. Wilkins	2,750	T. Webber	2,573
W. Blackburn	2,725	W. Price, Newport*	2,548
W. A. Linton	2,680		

*Accepted.

PETERBOROUGH.—For the erection of a dwelling-house, Harris-street, for Mr. Sandell. Mr. J. G. Stallebrass, architect, North-street, Peterborough:—

Kidd	£276 0 0	Rowe	£235 0 0
Machin	254 0 0	Guttridge	235 0 0
Hipwell	250 0 0	Gray	234 18 0
Sibley	250 0 0	Binder	231 0 0
Shepperson	245 0 0	Sharpe	228 10 0
Hicks	242 14 9	Nichols, Peterborough*	226 10 0
Bailey	240 10 0		

*Accepted.

PETERBOROUGH.—For the erection of five houses, Taverner's-road, for Mr. J. Eassom. Mr. Jas. Ruddle, architect, Boroughbury, Peterborough. Quantities by the architect:—

Wenlock	£876	Nichols	£830
Hicks	872	Bridgfoot	825
Hipwell	850	Wright	816
Shepperson	846	Bailey	799
Gray	838	Guttridge, Peterborough*	790

*Accepted.

PETERBOROUGH.—For the erection of a house, Taverner's-road, for Mr. J. W. Jackson. Mr. Jas. Ruddle, architect, Boroughbury, Peterborough. Quantities by the architect:—

Wenlock	£350 0	Machin	£327 10
Bridgfoot	344 0	Hipwell	310 0
Wright	333 0	Guttridge	310 0
Nichols	331 0	Bailey	308 0
Hicks	328 0	Shepperson, Peterboro'*	287 0

*Accepted.

PETEROBOUGH.—For the erection of two dwelling-houses, Cromwell-road, for Miss Flanders. Mr. J. G. Stallebrass, architect, North-street, Peterborough:—

Bailey	£406 0 0	Shepperson	£392 0 0
Sibley	405 17 0	Bridgfoot	385 0 0
Kidd	400 0 0	Sharpe	376 0 0
Wright	400 0 0	Guttridge	370 0 0
Noble	398 0 0	Nichols, Peterborough (accepted)	365 0 0
Machin	395 0 0	Gray	364 0 0
Hicks	395 15 7½		

PONTYPOOL.—For erecting new bank premises, Pontypool, for the London and Provincial Bank, Limited. Messrs. Seward & Thomas, architects, Cardiff:—

Burgoyne	£3,592	W. Jones & Son	£2,747
J. D. Williams	3,295	Claridge & Bloxham	2,738
H. Welsh	3,000	Henry Parfitt	2,700
Stephens, Bastow, & Co.	2,807	S. Shepton & Son	2,670
D. Jones	2,884	W. Lewis	2,650
Hatherly & Carr	2,797	John Linton	2,600
Lissaman	2,788	Morgan & Evans	2,517
Geo. Rutter	2,743		

RICHMOND.—For Private Street Works, for the Corporation of Richmond. Mr. E. J. Lovegrove, Borough Surveyor:—

	Ellerker Gardens.	Alexandra Road.	Princes Street.	Rosedale Cottages.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Wheeler, W. H	— —	2,064 0 0	— —	— —
Serf Bros. & Co.	— —	— —	489 0 0	538 0 0
W. Parker, Brentford	1,313 0 0	1,800 0 0	*355 13 9	479 0 0
Nowell & Robson	1,152 5 2	1,981 0 0	394 0 0	424 0 0
S. Hudson	1,136 0 0	1,832 0 0	406 0 0	452 0 0
James Hayward	980 1 5	1,657 11 10	359 1 7	368 2 0
J. E. Broderick, Richmond	*853 2 6	*1,487 16 4	392 1 2	*330 8 11
S. Atkins	995 0 0	1,665 0 0	385 0 0	385 0 0

*Recommended for acceptance subject to a loan being obtained from the Local Government Board.

ROTHERHAM.—Accepted for the erection of two houses, St. John's-road:—

Charles Green, Welgate, Rotherham £325

RUGBY.—For the erection of a wall 226 yards in length, for the Rugby Freehold Land Society. Mr. A. G. Greenhill, Surveyor, North-street, Rugby—

Heap	£230 0	Harris	£173 10
Hewitt	198 18	Young	168 0
Hollowell	178 0		

RUSHDEN (Northants).—For the erection of a shoe factory for Messrs. Knight & Lawrence:—

W. T. Sharpe	£1,120 0	Berrill Brothers	£688 0
H. Sparrow	749 0	S. Knight, jun., Rushden*	662 10
R. Marriott	720 0		

*Accepted.

SANDHURST.—For the erection of a new police station at Sandhurst, for the Berkshire County Council. Mr. Joseph Morris, architect, 156, Friar-street, Reading. Quantities by Messrs. H. Cooper & Sons, 17, Friar-street, Reading:—

L. Poffley	£1,945 10 0	Spear & King	£1,568 7 6
De Vere Buckingham & Co.	1,895 0 0	J. H. Margetts	1,558 0 9
D'Oyly & Co., Ltd.	1,888 0 0	A. Binnie	1,550 0 0
G. Brown	1,833 0 0	John B. Seward	1,538 0 0
William Stokes	1,811 0 0	J. S. Kimberley	1,527 0 0
William Goodchild	1,778 0 0	Alfred Simonds	1,499 0 0
Thomas Martin	1,740 0 0	Solden Hipwell	1,455 0 0
George H. Wheeler	1,658 0 0	Edwin C. Hughes	1,348 0 0
McCarthy E. Fitt	1,652 0 0	G. H. Tucker	1,337 0 0
D. Taylor	1,626 0 0	W. Hawkins	1,329 0 0
John Bottrill & Son	1,620 0 0	George Smith, High Wycombe*	1,234 15 6
Samuel East	1,593 0 0		

*Accepted.

DISCLAIMER.—The Sanitary Engineering and Ventilation Company, of 65, Victoria-street, Westminster, write to us to say that they are not "The Sanitary Engineering Company" mentioned in our issue of the 4th inst. (p. 183) as having sent in the highest tender for the drainage of Amersham workhouse.

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Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY, but those intended for the front Page should be in by TWELVE noon on WEDNESDAY

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1891.

*1. Canterbury	*Jan.* 3	*5. Wells	*May* 2	9. Norwich	Sept.
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*3. St. Alban's	*Mar.* 7	7. Salisbury	*July* 4	11. Lincoln	Nov.
*4. Peterboro'	*April* 4	8. Bristol	*Aug.* 1	12. Gloucester	Dec.

1892.

13. St. Paul's	*Jan.* 2	17. Llandaff	*May* 7	21. Bangor	Sept.
14. Hereford	*Feb.* 6	18. Oxford	*June* 4	22. St. Asaph	
15. Chichester	*Mar.* 5	19. Southwell	*July* 2	23. Winchester	Oct.
16. Ely	*April* 2	20. Worcester	*Aug.* 6	24. Truro	Nov.
		25. St. David's	*Dec.* 3		

1893.

*26. York	*Jan.* 7	28. Chester	*Mar.* 4	30. Carlisle	May
27. Ripon	*Feb.* 4	29. Manchester	*April* 1	31. Durham	June

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Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds and milk-rooms, granaries, tun-rooms, and terraces. Asphalte Contractors to the Forth Bridge Co. [ADVT.

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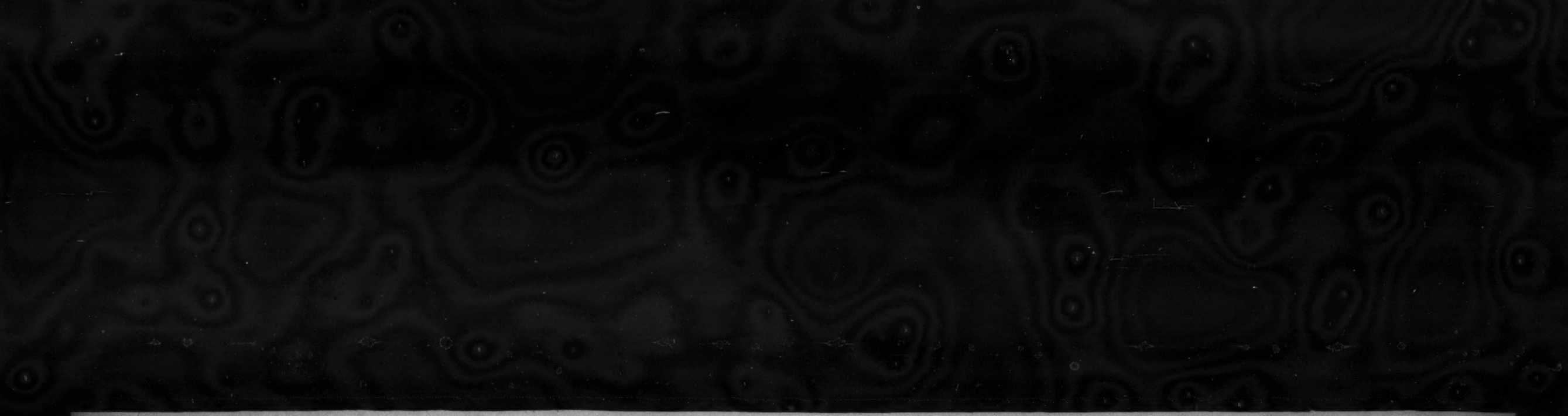
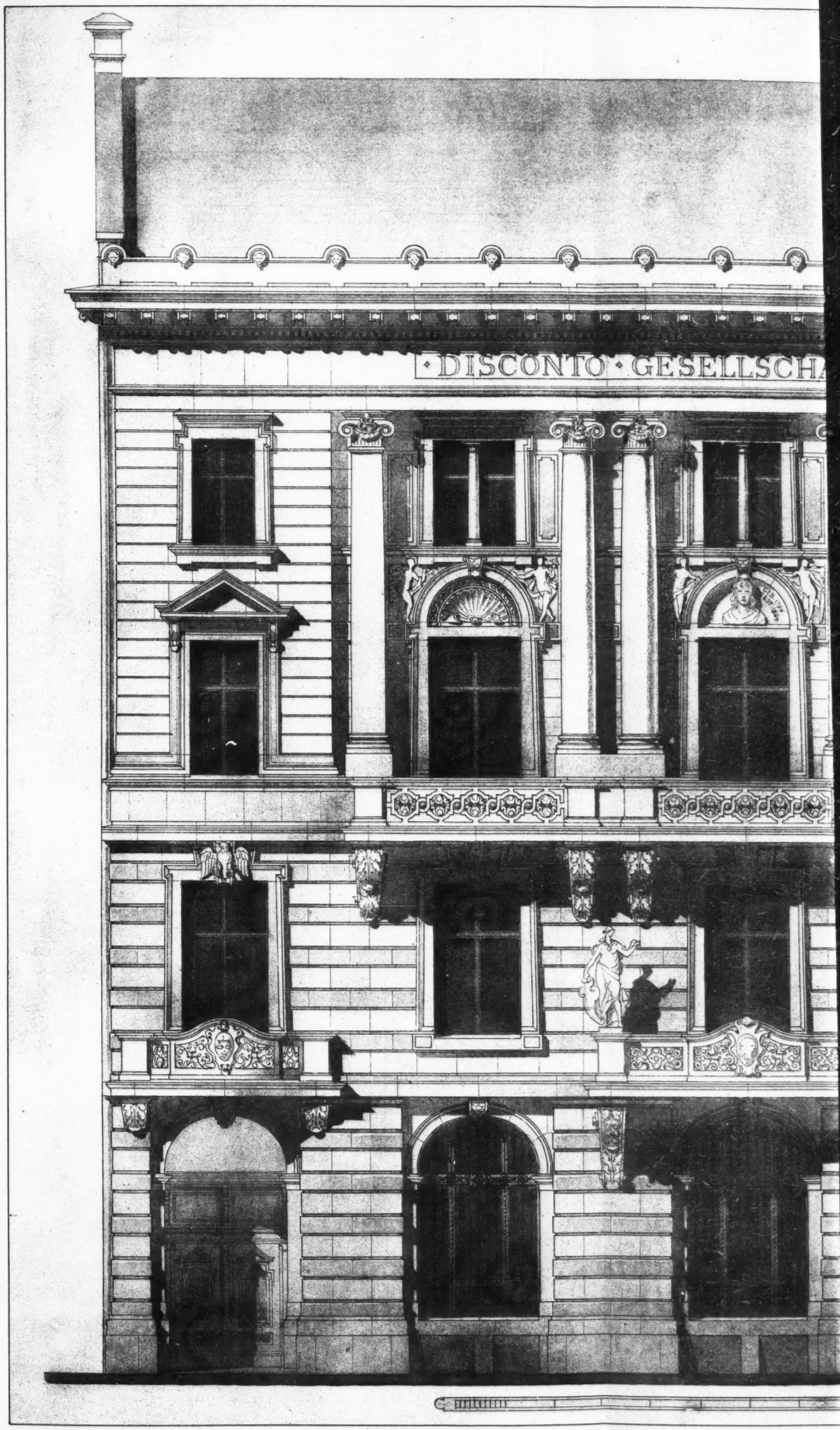


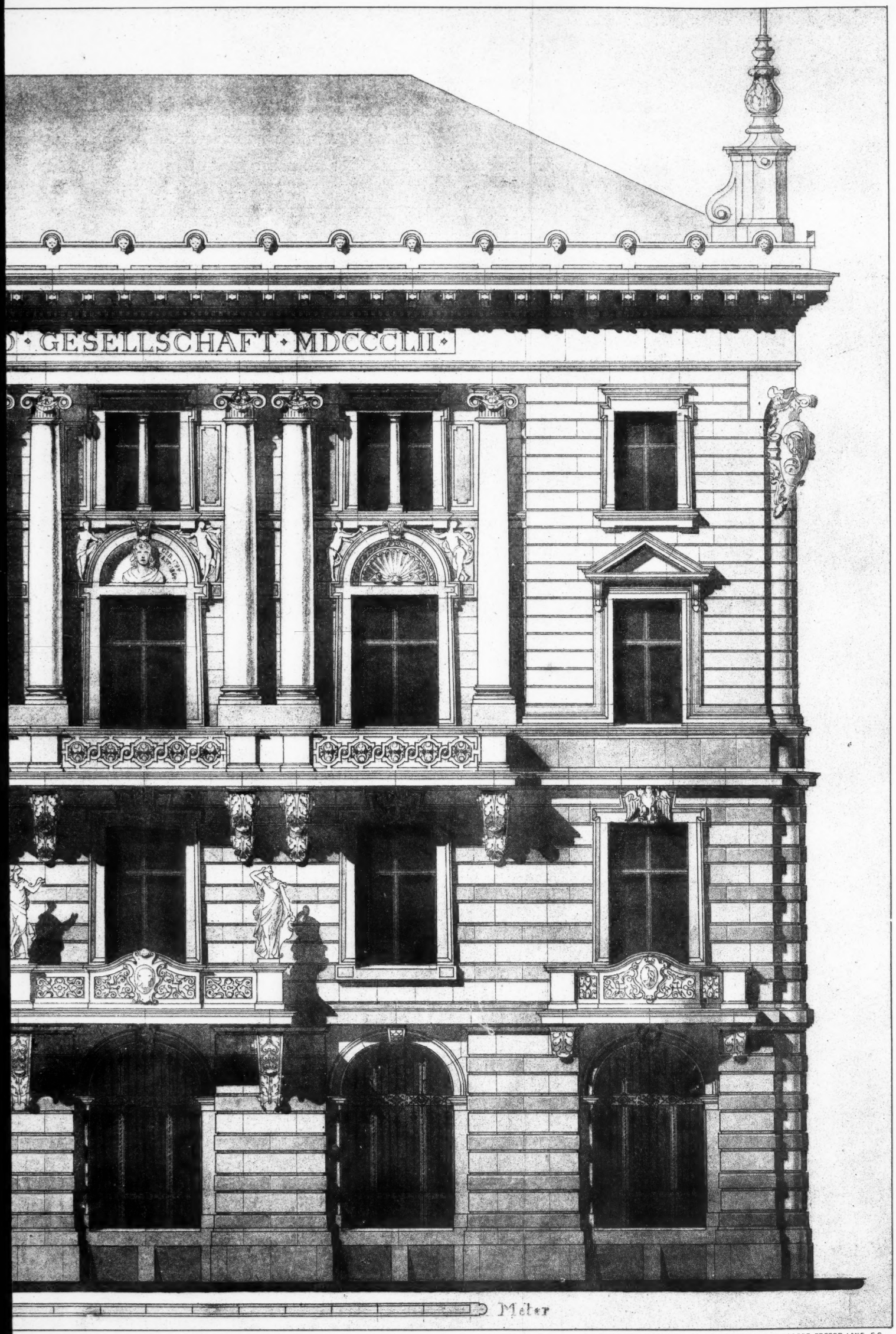
PART OF FRIEZE FOR GROCERS' HALL.—

INK PHOTO SPRAGUE & Co 4 & 5 EAST HARDING STREET FETTER LANE E.C.

ZE FOR GROCERS' HALL.—Mr. E. Roscoe Mullins, Sculptor



NEW BANK PREMISES, BERLIN.—Messrs.



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No 24 SOUTHAMPTON BUILDGS
for MESSRS CARPMAEL & COY
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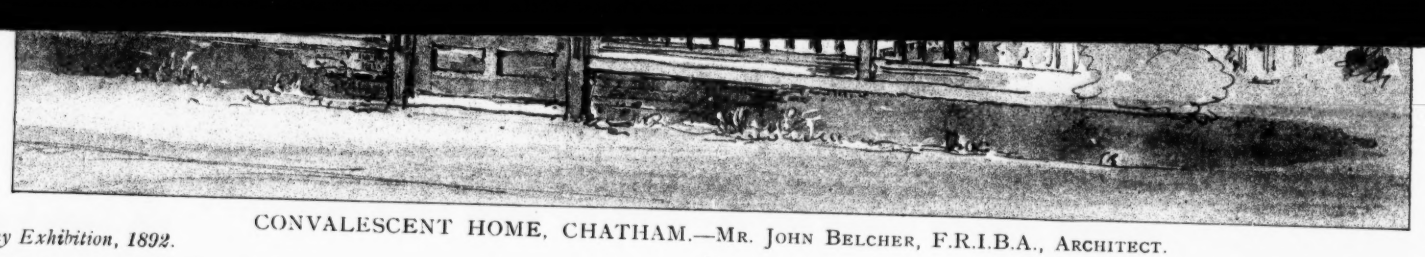
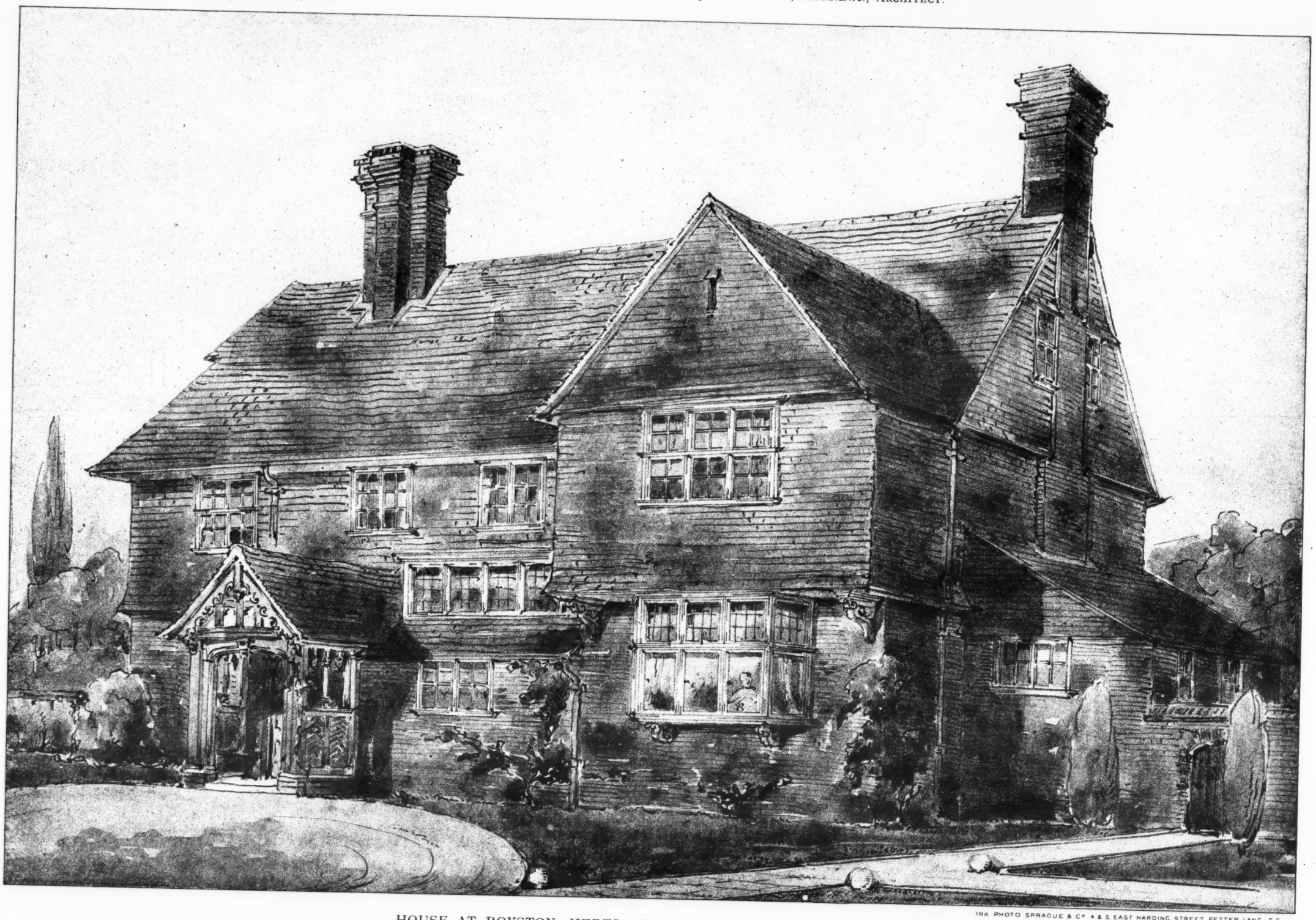
CONVALESCENT HOME, CHATHAM.—Mr. John Belcher, F.R.I.B.A., Architect.

Royal Academy Exhibition, 1892.



Royal Academy Exhibition, 1892.

CONVALESCENT HOME, CHATHAM.—Mr. John Belcher, F.R.I.B.A., Architect.



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HOUSE AT ROYSTON, HERTS.—Mr. John Belcher, F.R.I.B.A., Architect.

Royal Academy Exhibition, 1892.